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National Technical Information Service

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Trimble County Generating Station, Louisville Gas and Electric Co., Kentucky

Environmental Protection Agency, Atlanta, Ga Region IV

Feb 78

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5. Report Date February 1978

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8. Performing Organization Rept. No.

9. Performing Organization Name and Address
EPA, Region IV, EIS Branch
345 Courtland Street
Atlanta, GA 30308

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14. 904/00

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LG&E proposes to construct a 2340 megawatt coal-fired steam electric generating station at Wises Landing, Kentucky, Ohio River mile 571. A 1000 acre site for structural and pond facilities is needed as are two ajacent ravines (1300 acres) for solid waste disposal. Associated transmission facilities are also proposed. Major Federal actions for the project are issuance of new source NPDES Permit from EPA and a section 10/404 Construction Permit from the Army Corps of Engineers. Air Quality and scrubber technology are the major issues. Aesthetic and secondary impacts to the river valley are also significant issues. +

17. Key Words and Document Analysis. 17a. Descriptors

Wises Landing
Ohio River
Louisville Gas & Electric
Steam Electric
Generating Station
Scrubber
Air

National Pollutant Discharge Elimination System

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group

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ATTENTION

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EPA 904/9-78-001

PB 280 930

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

TRIMBLE COUNTY GENERATING STATION

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30308

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EPA 904/9-78-001
NPDES Application Number:
KY0041971

February 1978

DRAFT
ENVIRONMENTAL IMPACT STATEMENT

for

Proposed Issuance of a New Source National
Pollutant Discharge Elimination System Permit

to

Louisville Gas and Electric Company
Trimble County Generating Station
Trimble County, Kentucky

prepared by

U.S. Environmental Protection Agency
Region IV
Atlanta, Georgia 30308

Approved:

John C. White
Regional Administrator

January 23, 1978
Date

Summary Sheet For Environmental Impact Statement
Trimble County Generating Plant
Louisville Gas and Electric Company
Kentucky

(X) Draft

( ) Final

U.S. Environmental Protection Agency, Region IV
345 Courtland Street N.E.
Atlanta, Georgia 30308

1. Name of Action: (X) Administrative ( ) Legislative

2. Description of Action: This Environmental Impact Statement (EIS) was prepared by the Region IV office of the Environmental Protection Agency (EPA) as the lead Federal Agency. The purpose of this Statement is to fulfill the requirements of the National Environmental Policy Act (NEPA) and the EPA January 11, 1977 regulations: Preparation of Environmental Impact Statements for New Source NPDES Permits (40 CFR 6.900). NEPA requires all Federal agencies to assess the impacts that would occur following a major Federal action that has been determined to result in a significant impact on the human environment.

Louisville Gas and Electric Company, the Applicant, proposes to construct a new 2,340 megawatt (MW) coal-fired steam electric generating station between Ohio River Miles 570-572 or 0.5 mile upstream from Wises Landing, Kentucky. The project would increase the Applicant's electrical generating capacity. This capacity has been projected to be required by the Applicant. The facility would replace old units scheduled for retirement over an 8 year period starting in 1979, as well as provide for the increasing demand for power in the Applicant's service area.

The proposed project requires commitment of a 1000 acre site for construction of two 495 MW generating units, one operational in 1983 and the other in 1985, and two 675 MW generating units, one operational in 1987 and the other in 1989. Other major components of the station would be two 735 foot high stacks, two natural draft cooling towers, a switchyard, two onsite disposal ponds, a barge unloading facility, and water intake and discharge structures. The project also requires two ravines adjacent to the generating site totalling 1,300 acres to be used for solid waste disposal. Also proposed is a new 9 mile long corridor to accommodate two 345-kV transmission lines. The corridor would cross the Ohio River at the site and extend west into Clark County, Indiana and connect to a 138-kV line, 3 miles west of New Washington, Indiana.

No construction has commenced for this new facility pending issuance of the EPA NPDES Permit to discharge wastewater, the Corps of Engineers' Section 10/404 Construction Permit and other necessary Federal and State approval certificates and permits. Construction is scheduled to begin in July, 1978.

3. Major Environmental Impacts

(A) Construction

This project will represent the commitment of approximately 2,300 acres near Wises Landing to industrial land use from previous uses, mostly agricultural. The lower portion of a tributary (Corn Creek) to the Ohio River will be relocated. This represents a loss of good aquatic habitat. The project also represents a loss of significant acreage of fertile agricultural land and good habitat. Increased air pollution, mostly as fugitive dust, is expected on and near the site for the duration of the construction period. Pollutants will also be contributed to the Ohio River during this period from general site runoff and from construction of the barge facilities and water intake and discharge structures along the riverfront. There would be increased noise from construction activities and increased vehicular use of roadways leading to the construction areas. The construction work force is expected to peak at about 695 individuals, and cause significant socioeconomic changes in surrounding communities. The demand for goods and services created by the daily influx of workers and by worker relocations will significantly affect local communities. No archaeological sites worthy of mitigation were discovered during survey work.

The proposed transmission line in Indiana is required to integrate the Trimble County Generating Plant with the Applicant's system and to complete the 345-kV system loop. The 9 mile long transmission corridor will occupy 34.5 acres of which about half is woodland requiring clearing. Work on the corridor will result in localized short term air pollution and may cause siltation where stream crossings are required.

The estimated total construction costs to the Applicant for the new generating station and transmission system are $1,354 million.

(B) Operation

Operation impacts will occur for the life of the facility, about 36 years. Most significant will be the impact to air quality within the Ohio River Valley area resulting from sulfur dioxide, nitrogen oxides, and particulates emitted by the facility. Visible water vapor plumes emitted from the cooling towers will at times extend 3.1 miles from the plant. Emissions from the stacks will to varying degrees contribute to acidic sulfate formation. Coal usage by all four units is projected to be about 112,500 tons (75 barge loads) per week.

The projected enormous quantities of solid wastes generated during operation are a major consideration. Besides the acreage for ponds on site, a gradual but complete elimination of 1440 acres of pasture and woodland vegetation in the ravines will occur over the life of the facility.

The large quantity of water (68,541 gallons per minute, maximum) withdrawn from the river will result in loss of numerous small aquatic organisms as a result of entrainment by the plant. The discharge of heated wastewater and plant service water (40,900 gallons per minute maximum) will have a minor impact on aquatic life in the river.

Citizens of Trimble County will experience significant long-term impacts as a result of plant operation. Increased noise, traffic congestion, and other adverse environmental impacts attendant on a large industrial development will irreversibly alter the rural setting of the site and nearby communities. Expansion of the tax base from the assessment of the facility and the revenue obtained from management spending will be significant. The anticipated 350 operational personnel will directly stimulate business, especially retail trade and the housing industry although only a fraction of the operational personnel are expected to seek housing within the county.

Secondary impacts will result from inducement of satellite development. Although most of the goods and services required by the project will originate in Louisville, development of non-agricultural business will be significantly stimulated. A major secondary impact of this facility will result from the Trimble County Generating Plant's use of almost all of the available sulfur dioxide air quality deterioration increment. This could preclude another industry with a similiar type and magnitude of air emissions from locating in the immediate area.

4. EPA Position on Mitigation of Impacts

The proposed facility will be required to meet all New Source Performance Standards pertaining to water discharge and water quality standards under NPDES permitting authority and will be restricted by New Source Air Emissions limitations under the Clean Air Act. Impact to terrestrial and aquatic wildlife has been significantly reduced by changing the onsite disposal ponds to preserve a wetland creek oxbow. However, the EPA Region IV has identified several potentially adverse environmental impacts that require further mitigation. The following mitigative measures have been developed by the Agency and the Applicant. The Applicant has agreed to:

- Monitor groundwater to detect any contamination and, if needed, take steps to reduce it
- Control site erosion and reduce sediment entering the Ohio River, Corn Creek, and Barebone Creek
- Provide for adequate, environmentally acceptable waste disposal
- Provide for flue gas desulfurization system malfunctions
- Restrict use of herbicides on transmission corridor work
- Provide for identification of valuable vegetation and wildlife habitat along transmission corridors attendant on the new station
- Provide for identification of archaeological resources along transmission corridors attendant on the new station

5. Alternatives to the Proposed Action

(A) Alternatives not requiring new capacity

(B) Alternatives requiring new capacity

(1) Alternative sites
(2) Alternative fuels
(3) Alternative plant system design
(4) Alternative waste treatment and disposal
(5) Alternative electrical transmission

6. Federal, State and local agencies and interested groups requested to comment:

Federal Agencies

Bureau of Outdoor Recreation
U.S. Coast Guard
Corps of Engineers
Council on Environmental Quality
Department of Commerce
Department of Energy
Department of Health, Education and Welfare
Department of the Interior
Department of Transportation
Department of Housing and Urban Development
Economic Development Administration
Federal Highway Administration
Fish & Wildlife Service
Food and Drug Administration
Forest Service
Geological Survey
National Park Service
Soil Conservation Service

Members of Congress

Honorable Walter D. Huddleston
United States Senate

Honorable Birch Bayh
United States Senate

Honorable M. Gene Snyder
U.S. House of Representatives

Honorable Lee H. Hamilton
U.S. House of Representatives

Honorable Wendell Ford
United States Senate

Honorable Richard Lugar
United States Senate

Honorable Romano L. Mazzoli
U.S. House of Representatives

State

Kentucky

John M. Berry, Jr.
State Senate

Robert A. Jones
State Representative

Indiana

James A. Butler, Jr.
State Senate

Wilfrid Ullrich
State Senate

Local

Clyde E. Greenwood
Trimble County Judge

Interested Groups

League of Kentucky Sportsmen
The Nature Conservancy
Citizens League to Protect the Surface Rights
Garden Club
Izaak Walton League
Kentuckian's for Environmental Planning
Kentucky Federation of Women's Clubs
League of Women Voters
Appalachia Research and Defense Fund
Kentucky Audubon Council
Home Builders Association
Kentucky Coal Association
Hardin County Environmental Council
Save The Valley
Kentucky Water Resources Research Institute
Natural Resources Defense Council
Friends of the Earth
Environmental Defense Fund
Sierra Clubs
Save Our Streams
Tennessee Conservation League
The Filson Club
Kentucky Rivers Coalition
Save our Kentucky
Citizens Energy Coalition

Purdue Environmental Action

7. This draft EIS was made available to the EPA Office of Federal Activities and the public on FEB 17 1978.

PREFACE

The Louisville Gas and Electric Company (the Applicant) has applied to the Environmental Protection Agency (EPA) for a National Pollutant Discharge Elimination System (NPDES) permit for a proposed four-unit, 2,340-megawatt (MW) fossil-fuel power plant to be located in Trimble County, Kentucky near the community of Wises Landing. In compliance with its responsibility under the National Environmental Policy Act (NEPA) of 1969, the Regional Administrator of EPA conducted a review of the proposed project and determined that the issuing of the NPDES permit for the Applicant's proposed project would constitute a major federal action. Therefore, before a decision to issue the permit can be made, an environmental impact statement describing the probable impacts of the proposed project on the natural and human environment is required. This report and a draft of the NPDES permit constitute the planning documents that will allow all federal, state, and local agencies that have the responsibility of permitting and licensing the proposed project, plus the concerned public, to determine: (1) whether the Applicant's project should be granted the required permits and licenses, including the NPDES permit, and (2) if the probable adverse impacts of the project on the environment have been adequately eliminated or mitigated.

The following sections of this document provide a summary of: (1) the major aspects of the proposed project, (2) alternatives to the project, (3) probable impacts resulting from the project, and (4) measures designed to eliminate or mitigate these impacts. This document, along with the supporting report and technical appendix, constitutes the Draft Environmental Impact Statement (EIS). This document is intended to provide the interested public with a general description, in an easily readable form, of the proposed project and its relationship to the air, land, water, and human components of the environment it is likely to affect. For those requiring copies of the supporting report and technical appendix, a limited number are available for distribution. Requests for copies should be made to:

Mr. John E. Hagan III
Chief, EIS Branch
Environmental Protection Agency
345 Courtland Street, NE
Atlanta, GA 30308

Copies of the supporting report and technical appendix for the Draft EIS are also available for review at the following locations:

Capitol Regional Library (Frankfort, Kentucky)
Carroll County Public Library (Carroll County, Kentucky)
Duerson-Oldham County Public Library (Oldham County, Kentucky)
Jeffersonville Township Public Library (Clark County, Kentucky)
Lexington Public Library (Lexington, Kentucky)
Louisville Free Public Library (Louisville, Kentucky)
Madison-Jefferson County Public Library (Jefferson County, Indiana)
Northern Kentucky Regional Library (Covington, Kentucky)
Public Library of Cincinnati and Hamilton County (Cincinnati, Ohio)
Trimble County Library (Milton, Kentucky)
University of Louisville Library (Louisville, Kentucky)

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THE APPLICANT

Louisville Gas and Electric Company (the Applicant) distributes and sells electricity to 284,066 ultimate consumers (as of December 31, 1976) in Jefferson County and portions of Oldham, Bullitt, Meade, and Hardin Counties, and limited parts of Henry, Trimble, Shelby, and Spencer Counties, Kentucky (Figure 1). The area served covers approximately 700 square miles and contains an estimated population of 790,000, exclusive of the Fort Knox Military Reservation, which the Applicant also serves with electricity.

The Applicant wholly owns one subsidiary, Ohio Valley Transmission Corporation, an Indiana corporation. This subsidiary exists to own and operate those facilities located in Indiana that are necessary to the system operations. Neither Ohio Valley Transmission Corporation nor the Applicant sells electricity directly to any ultimate consumers in Indiana.

The Applicant presently has transmission interconnections and interconnection agreements with Public Service Indiana, Kentucky Utilities Company, Southern Indiana Gas & Electric Company, The Cincinnati Gas & Electric Company, Ohio Valley Electric Corporation, Tennessee Valley Authority, East Kentucky Power Cooperative, and Big Rivers Electric Corporation. These interconnections and interconnection agreements provide for various interchanges, emergency services, and other working arrangements. Power is normally exchanged via these interconnections for emergency, maintenance, or economy purposes on an "as-available" basis.

As of December 1976, the net seasonal summer generation capacity of the Applicant's system is 2,139 MW (Table 1). The bulk of this capacity is coal-fired, although it does include six combustion turbine units and eight run-of-the-river hydroelectric units.

The Applicant has two new units with capacities of 425 MW and 495 MW under construction at the Mill Creek plant. These are scheduled for operation in December 1977 and June 1980, respectively. The new Mill Creek units, and other units planned through 1990, are described in Table 2.

Several older units will be retired, as shown in Table 3. These units are scheduled to be retired because they will be obsolete, relatively inefficient to operate, costly to maintain, and difficult to retrofit with equipment that is required to comply with environmental regulations. The retirement of these units is part of an existing pollutant emissions compliance agreement between the Applicant and the EPA.

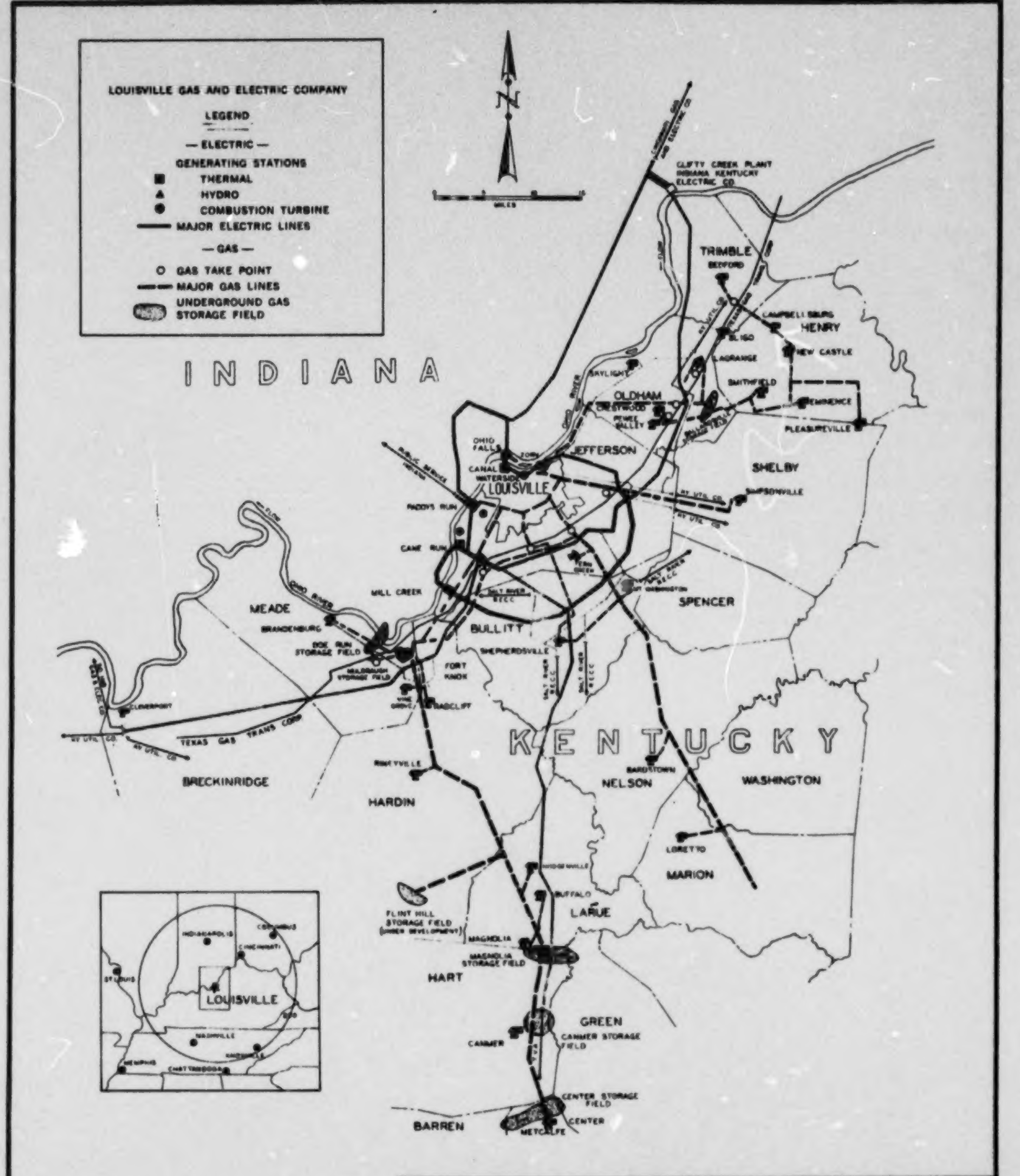
The Applicant forecasts that the net total electric demand of its customers can reasonably be expected to increase from 1,707 MW (the adjusted load during the summer of 1976) to 2,482 MW by 1983 and 3,543 MW by 1990. Table 4 presents the Applicant's projected system loads and capacities, 1976 through 1990. A preliminary analysis of the actual 1977 summer load data for the Applicant's system generally confirms the demand forecast for the summer of 1977.

In order to meet the projected future load growth and to maintain reliable service, the Applicant has determined that it is necessary to add to its system a new generating facility to begin service in 1983. To this end, the Applicant has proposed to construct a 2,340-MW generating plant near Wises Landing in Trimble County, Kentucky.

The Applicant has projected the need to commence construction on this facility to provide the load requirements necessary to compensate for (1) scheduled retirements at its Paddys Run and Cane Run Stations and (2) projected increased demand throughout the service area. The construction schedule and projected online dates for each of the four units as described in Table 4 will be adjusted if continuing projections of need so require.

The final analysis was made by comparing the composite load of four major components of the forecast to the composite load growth of recent history within the Applicant's system. Based on a 1965 - 1974 data base and an exponential curve-fit (as commonly used in the industry), the composite load growth shows an overall compound growth rate of 8.5 percent, which would project forward to 6,288 MW by 1990. However, the growth rate forecast by the Applicant ranges from 4.1 percent through 6.1 percent and back down to 4.9 percent by 1990. This is because, for the period 1975 through 1976, some (but less than full) economic recovery was assumed to occur. This is reflected particularly in the growth rate assigned to the industrial segment. The composite growth rate for 1976, therefore, was estimated to be 1.6 percent. From 1976 forward, a gradual increase in recovery of the economy, particularly in the large industrial sector, was projected. This is reflected in the 6.1 percent growth rate. However, this rate is predicted to decline to 4.9 percent (3,543 MW) by 1990. The Applicant believes that the potential for significant increases in the cost of electric energy and the sensitivity to, and recognition of, diminishing natural energy resources, might reasonably be expected to create an economic and moral pressure for conservation in new growth. Further, retrofitting of existing residential dwellings with air conditioning is expected to have reached saturation by this time. Therefore, a slower growth rate should be in effect by 1990.

The methodology and data on which this determination is based are described in Sections 1.3 through 1.5 of the supporting report.



LOUISVILLE GAS & ELECTRIC CO.
TRIMBLE COUNTY GENERATING PLANT

SYSTEM MAP

FIGURE 1

TABLE 1

LOUISVILLE GAS AND ELECTRIC COMPANY
PRESENT GENERATING CAPACITY

Station and Unit Number	In Service Date	Type	Net Seasonal Summer Capability in KWe[a]
CANE RUN #1	1954	Steam-Coal	110,000
#2	1956	Steam-Coal	107,000
#3	1958	Steam-Coal	137,000
#4	1962	Steam-Coal	174,000
#5	1966	Steam-Coal	183,000
#6	1969	Steam-Coal	277,000
			988,000
CT #11	1968	Combustion Turbine	16,000
		TOTAL	1,004,000
MILL CREEK #1	1972	Steam-Coal	334,000
#2	1974	Steam-Coal	325,000
		TOTAL	659,000
PADDY'S RUN #1	1942	Steam-Coal	29,000
#2	1942	Steam-Coal	28,000
#3	1947	Steam-Coal	63,000
#4	1949	Steam-Coal	65,000
#5	1950	Steam-Coal	70,000
#6	1952	Steam-Coal	67,000
			322,000
CT #11	1968	Combustion Turbine	17,000
CT #12	1968	Combustion Turbine	26,000
			43,000
		TOTAL	365,000
WATERSIDE #7	1964	Combustion Turbine	17,000
#8	1974	Combustion Turbine	18,000
		TOTAL	35,000
ZORN CT #11	1969	Combustion Turbine	15,000
OHIO FALLS - 8 units	1928	Run-of-River Hydrostation	61,000
	Total System Steam		1,969,000
	Total System Combustion Turbine		109,000
	Total System Hydro		61,000
		TOTAL	2,139,000

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[a] Data from latest East Central Area Reliability Coordination Agreement uniform rating documents.

Source: Louisville Gas and Electric Company, January 1977.

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TABLE 2

LOUISVILLE GAS AND ELECTRIC COMPANY
GENERATION RESOURCE ADDITIONS
1976-1990

Station and Unit Member	Operating Date	Type	Net Capacity of Unit in KWe
MILL CREEK #3	Scheduled Dec. 1977	Steam-Coal	425,000
#4	Scheduled June 1980	Steam-Coal	495,000
	Total Addition		920,000
TRIMBLE COUNTY #1	Planned June 1983	Steam-Coal	495,000
#2	Planned June 1985	Steam-Coal	495,000
#3	Planned June 1987	Steam-Coal	675,000
#4	Planned June 1989	Steam-Coal	675,000
	Total Addition		2,340,000
UNDESIGNATED	Planned June 1984	Combustion Turbine	65,000
	Total Resource Addition		3,325,000

Source: Louisville Gas and Electric Company, January 1977

TABLE 3

LOUISVILLE GAS AND ELECTRIC COMPANY GENERATING STATION RETIREMENT PLANS 1976-1990

Station and Unit Number		Planned Retirement Date	Type	Net Capacity of Unit in KWe
Paddy's Run	#1	June 1979	Steam-Coal	29,000
	#2	June 1979	Steam-Coal	28,000
	#3	June 1981	Steam-Coal	63,000
	#4	June 1981	Steam-Coal	65,000
	#5	June 1983	Steam-Coal	70,000
	#6	June 1984	Steam-Coal	67,000
Cane Run	#1	June 1985	Steam-Coal	110,000
	#2	June 1985	Steam-Coal	107,000
	#3	June 1987	Steam-Coal	137,000

Source: Louisville Gas and Electric Company, January 1977.

TABLE 4

LOUISVILLE GAS AND ELECTRIC COMPANY PROJECTED SYSTEM LOADS AND CAPACITIES, 1976-1990

(Note: Parentheses indicate negative numbers)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Peak Load (MWe)[a]	1707[b]	1778	1862	1975	2091	2211	2344	2482	2624	2768	2915	3065	3221	3381	3543
Capacity Changes															
Steam		425[c]			495			495		495		675		675	
Combustion Turbine									65						
Hydro															
Rerating	(4)		(8)[d]	(13)[d]		(15)[d]	(15)[d]								
Retirements				(57)[e]		(128)[f]		(70)[g]	(67)[h]	(217)[i]		(137)[j]			
Firm Purchases (Sales)[k]	(55)		(11)	(13)	(17)										
Total Capacities															
Steam	1969	1969	2386	2316	2811	2668	2653	3078	3011	3289	3289	3827	3827	4502	4502
Combustion Turbine	109	109	109	109	109	109	109	109	174	174	174	174	174	174	174
Hydro	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Firm Purchases (Sales)[c]	(10)	(10)	(21)	(34)	(51)	(51)	(51)	(51)	(51)	(51)	(51)	(51)	(51)	(51)	(51)
TOTAL (MWe)	2129	2129	2535	2452	2930	2787	2772	3197	3195	3473	3473	4011	4011	4686	4686
Reserve - With Trimble County															
Capacity	422	351	673	477	839	576	428	715	571	705	558	946	790	1305	1143
Percent of Peak Load	25	20	36	24	40	26	18	29	22	25	19	31	24	38	32
Reserve - Without Trimble County															
Capacity	422	351	673	477	839	576	428	220	76	(285)					
Percent of Peak Load	25	20	36	24	40	26	18	9	3	(10)					

---

[a] Median summer forecast.

[b] Adjusted for temperature and known curtailments.

[c] December 1977 operating date--not available for 1977 summer peak.

[d] Deratings due to sulfur dioxide removal systems.

[e] Retirement Paddy's Run #1 and #2.

[f] Retirement Paddy's Run #3 and #4.

[g] Retirement Paddy's Run #5.

[h] Retirement Paddy's Run #6.

[i] Retirement Cane Run #1 and #2.

[j] Retirement Cane Run #3.

[k] Ohio Valley Electric Corporation (OVEC) sales or purchases.

ALTERNATIVES CONSIDERED

INTRODUCTION

The Council on Environmental Quality's and the Environmental Protection Agency's guidelines for evaluating alternatives indicate five aspects of a proposed project that need to be addressed:

1. Has the no-action alternative been considered; that is, is it possible that the Applicant might not require a new generating station?
2. Is postponing the construction and operation of the facility environmentally and economically practical?
3. What are the available alternative methods of obtaining this additional capacity?
4. What are the available alternative sites for locating the generating facility?
5. What are the available design alternatives for the generating facility?

The following is a summary presentation of the process by which the questions were evaluated and of the major feasible alternatives that were considered.

EVALUATION PROCESS

Once the Applicant notified the EPA of its intent to apply for an NPDES permit for a 2,340-MW fossil-fuel generating plant and the EIS process was instituted, the Applicant's design firm began its analysis of the engineering alternatives for a fossil-fuel power plant capable of producing the required generating capacity. At the same time, an evaluation of the environmental considerations related to the project was begun by the environmental consultant, Dames & Moore (hereinafter referred to as the Consultant), retained by the Applicant to prepare the EIS under the direction of EPA Region IV. The Applicant submitted a study of the forecasting assumptions and methodology by which it had determined that its system required a new facility of the size proposed. This study was reviewed by the EPA, an independent consultant retained by the Consultant, and the Federal Power Commission. The Commission and the independent consultant concluded that the forecasting technique and the results were reasonable. At the same time, the Consultant also retained another independent consultant to perform an evaluation of alternative sites for the proposed project. Concurrently, conceptual engineering studies, which included an evaluation of engineering alternatives, were completed by the design firm and reviewed by the Consultant and EPA. These studies were then used to prepare Sections 1.0 through 4.0 of the supporting report.

The following is a description of the results of these evaluations.

ALTERNATIVES TO CONSTRUCTING A 2,340-MW GENERATING PLANT

Abandoning the Project

Not providing the additional generating capacity required to meet the projected increased customer demand within the Applicant's service area would be detrimental to the service area customers and the regional economy. Without additional capacity, it is projected that, by 1985, the Applicant would not have sufficient reserve capacity to cover a forced outage of one of its larger units, a maintenance shutdown of one of its larger units, or a combination of a series of smaller capacity losses within its system. As demand continued to grow, the system reserve capacity would be further reduced.

The results of such inadequate reserve capacity could be expected to cause regular brownouts and occasional blackouts within the Applicant's service area. Residential customers most affected by these incidents would be those in newer, all-electric homes or apartment buildings. Industrial customers could decide to cut back production or move from the area, while commercial customers might be forced to reduce their operating hours. The results of such actions on the part of these two customer groups would be employee layoffs, lower levels of productivity, reduced income to commercial establishments and their employees, reduced commercial services, and, in general, a severe economic impact within the Applicant's service area.

Obtaining Required Energy From Other Sources

Three alternative means of obtaining the energy required to meet the increase in customer demand were evaluated:

1. Purchase of energy from other utilities
2. Uprating of older plants
3. Reactivation of retired plants

Purchase of energy was not found to be a viable alternative primarily because the energy available for purchase from neighboring utilities on a long-term basis is not sufficient to meet the projected demand. Also, were sufficient energy available for purchase, its cost would be higher than that generated by the Applicant, and this higher cost would be borne by the customer.

Uprating of older plants and reactivation of retired plants were rejected as viable alternatives for three reasons. First, the generating equipment in older or retired units is worn and less efficient to operate. The results are: (1) higher operating and maintenance costs and (2) reduced reliability. Second, the amount of additional capacity that could be achieved by uprating older units is relatively minor, compared to the amount required to meet the projected demand increases within the Applicant's service area. Third, although the older or retired units could conceivably be modified in order to achieve the required generating capacity increases, sufficient physical space is not present on the sites of these plants to support large capacity additions. Because modern pollution control systems and their waste disposal requirements were not part of the original plants, the sites of these plants do not provide sufficient acreage to accommodate them.

In addition, pollution control devices and their waste disposal requirements are very costly. By attempting to supply the projected increased demand by constructing a series of new units on older sites, if this were possible, the result would be excessive duplication of many of the most costly facilities. This would result in the loss of the economies of scale.

Joint Projects and the Construction of Smaller Facilities

Joint projects are generally a feasible alternative arrangement for constructing a power plant; such an alternative, however, does not eliminate the need to construct a new generating plant. Such an option potentially expands the number of sites available for the location of a plant.

However, at the time the Applicant began planning the proposed project, it was not a member of a power pool or cooperative agreement (this is still the case). Such agreements are complex, and their initiation would require a significant amount of lead time. Further, a coordination of the Applicant's needs with those of the other members of the agreement would be required, and the Applicant's ability to modify construction scheduling would be reduced.

The Applicant prefers to rely on internal generation capability to supply its system's needs rather than on pool or other cooperative agreements. It claims that such a policy results in lower generation costs and, consequently, lower electrical rates for its customers.

The construction of a smaller facility (990-MW total) could be undertaken by the Applicant. Such a facility would supply the capacity necessary to meet increased demand projected for the service area until 1985. After this time, the projected continued growth would require the construction of an additional facility. However, the economic costs associated with such an alternative are far greater than those associated with the construction of a single, large facility. Additionally, the environmental costs would also be greater, as another 500+ acres of land would be required for the second facility. The environmental impacts resulting from the construction and operation of the second facility would be only somewhat less than those associated with the larger facility. (Depending on the nature and location of the site for the second facility, the associated impacts could conceivably be more significant.)

ALTERNATIVE MEANS OF GENERATING THE REQUIRED POWER

There are four alternative means available to the Applicant of generating the required power: nuclear, water, oil, and coal. Gas, because of its shortage, is not a feasible alternative. Other alternative generation means, such as solar and geothermal, have not been developed to the point where they are available for use in a large-scale, continuous operation. In Kentucky, pumped storage is not a viable option because of the geology of the area.

The present estimated lead time required for the planning, design, and construction of a nuclear power plant is 8 to 10 years. At the time (1974) that the Applicant began planning for the proposed project, it was anticipating the need for a new unit by 1981, which eliminated a nuclear plant from consideration.

Furthermore, the economics of nuclear plant development dictate a unit size of 800 MW or larger. At present, the Applicant's system does not have the reserve capacity to support the outage of a unit of this size.

The large-scale use of hydroelectric generation in the Ohio River valley is not feasible because of the lack of suitable sites.

As a fuel for generating electricity, oil is not a viable alternative in Kentucky at this time. The use of oil as a fuel for electric power generation is presently being curtailed by government regulations. Furthermore, in a state like Kentucky where there are large coal reserves, it does not make good sense to burn a fuel that is more costly, less abundant, and, because most of it is imported from a foreign source, less reliable than coal.

Coal in varying sulfur contents is available in abundance in Kentucky. The Applicant proposes to use high-sulfur western Kentucky coal because this coal is reasonably certain to be available in sufficient quantities for the 36-year life of the facility. Also, western Kentucky coal is presently the most economical choice, even though expensive flue gas desulfurization equipment is required to control the sulfur emissions that result from the burning of high-sulfur coal.

Low-sulfur coals from the western states have been ruled out as an alternative because Kentucky coal is a cheaper and more reliable source of fuel.

Washing high-sulfur coal improves its Btu output and lowers the amount of sulfur and other impurities. Washed coal may be used by the Applicant if it becomes available in sufficient quantities and the cost is not excessive.

ALTERNATIVE SITES FOR A 2,340-MW GENERATING PLANT

Seven candidate sites (out of an initial 17 sites) were evaluated as potential locations for the Applicant's proposed plant. Of these seven sites, five were on the Ohio River flood plain. The two remaining sites (Garrett and LaGrange) were located inland from the river (see Table 5). The factors considered in the evaluation process were land use, cultural and recreational features, ecology, aesthetics, water supply, water quality, geology, natural and man-related hazards, meteorology, and air quality. Certain cost-related factors associated with site development and plant operation were also considered. These were land acquisition, cost of transporting coal and other materials, transmission line costs, cost of developing a cooling water supply, and cost of site preparation. Another criterion, related to the nature of the Applicant's service area, was also included in the evaluation of the seven candidate sites--proximity to the northern portion of the service area. This area is presently experiencing the fastest growth rate and will therefore require a larger portion of the power generated by the proposed project. Table 5 provides a summary comparison of the seven sites. Maps of the sites, plus a detailed description of each, are presented in Section 3.4 of the supporting report.

The Trimble County site was selected by the Applicant as the preferred alternative on the basis of the following factors: (1) ample acreage available for plant siting and solid waste disposal, (2) easy access to cooling

TABLE 5

ALTERNATIVE SITES SUMMARY MA

Site	LOCATION		SITE, TOPOGRAPHY, AND GEOLOGY		SITE DEVELOPMENT	
	Advantages	Disadvantages	Advantages	Disadvantages	Advantages	Disadva
BRANDENBURG	On flood plain; consequently, advantageous for cooling water access and barge transportation. Access to Louisville load center. Access to Louisville & Nashville rail line for alternate transportation.	Near Olin Corporation Doe Run plant, so that emissions may be additive. Also located so that prevailing winds may carry SO_2 emissions into Jefferson County, an AQC maintenance area.	From 700-800 acres of nearly level land. Good drainage. Unconsolidated alluvial sediments adequate for plant foundations.	Topography (partially valley along Flippins Run) somewhat conducive to cooling tower-induced fogging and icing. Site is somewhat small for 2,400-MWe facility: there is not adequate space for the desired 60,000 acre-foot solid waste storage area. Bluffs rising 300 ft on each side of river are potential cause of aerodynamic plume downwash and may create necessity for tall stacks.	Advantageous with respect to availability of cooling water and barge docking facilities to allow transport of construction materials, plant components, coal fuel. Alternate rail transportation also available. Good highway access by State Highway 933 or improvements to the "Ohio River Trail" road.	13 miles from 345-kV grid. Some difficult a direct transm would cross Ohio through Indiana. No solid waste desired size.
GARRETT	The site is an upland location and therefore provides good ventilation.	Site is almost 5 miles from the river, so all materials would have to be transported by rail and cooling water conveyed by pumping. Also disadvantageous is the distance to the nearest point on the 345-kV transmission line - 16 miles.	From 800-900 acres available for development.	Topography and geology highly disadvantageous because of karst terrain and underlying Mississippian limestones, which are subject to solution weathering. Weathering could lead to problems with foundation support, integrity of water reservoirs, and possible ground water contamination from coal pile and solid waste storage areas.	Elevation is advantageous in that shorter (less expensive) stacks can be used.	Development co very high due from river (nec ing a rail spur, and a line for cooling water, storage reserv from existing karst topography obtaining sound rolling topog of extensive gr
HAMPTON CREEK	Because this site is on the river, access to cooling water and barge facilities is good. Site is less than 50 miles from Louisville. Good access to Applicant's 345-kV line. Near the growth area of the Applicant's service area.	Proximity to Kentucky Route 36, which is heavily travelled, may cause public opposition. The fact that the site is not in the service area might also increase opposition, particularly if American Electric Power Company actively pursues their interest in a tract of land near the site.	Good site size, with 1,000-1,200 acres of nearly level or gently sloping land available. Site has excellent drainage and would be free from flood hazards (site is a high river terrace). Site offers good foundation conditions (probably alluvial sands and gravels) for plant structures.	Bluffs on either side of river (400-450 high) would necessitate use of very tall stacks to overcome plume downwash and trapping in the valley.	Costs would be comparatively low because of location near river and highly favorable topography and soil conditions, which factors allow for: direct access to cooling water and barge transport; good drainage; and good foundation conditions. Size and levelness also cut costs. Kentucky 36 provides easy access to site.	Coal would have over or under is heavily trav populated.
LAGRANGE	Location is within 2 miles of 345-kV line. Location is upland, which makes it favorable for ventilation; consequently air quality problems and stack construction costs are reduced. Near the growth area of the Applicant's service area.	Location is 4 miles inland from Ohio River, so that rail transport and pumping facilities would have to be constructed for water and material supplies.		Although the site contains over 600 acres that could be developed only 300 acres are of gentle topography. This size would be somewhat limiting, and the site would require extensive preparation. Solution weathering phenomena at site may cause problems in reservoir construction and make it difficult to achieve stable foundations for plant structures.	Transmission line could easily be run into 345-kV line 2 miles from site.	Costs would be the rough terr extensive solut of underlying larly since lar may be required and for the dam water reservoir. channeling would difficult to pr water resource leakage from the ash storage pon Construction of rail spur over terrain would Besides the hig costs, there annual costs pumping water height and dist

TABLE 5

ALTERNATIVE SITES SUMMARY MATRIX

	SITE DEVELOPMENT		AIR QUALITY CONDITIONS AND EFFECTS		LAND USE - ECOLOGY AND EFFECTS	
	Advantages	Disadvantages	Advantages	Disadvantages	Advantages	Disadvantages
alley what ower- ng. for here or the solid each ntial umes neces-	Advantageous with respect to availability of cooling water and barge docking facilities to allow transport of construction materials, plant components, coal fuel. Alternate rail transportation also available. Good highway access by State Highway 933 or improvements to the "Ohio River Trail" road.	13 miles from nearest point on 345-kV grid. Some difficult routing, because a direct transmission line route would cross Ohio River and go through Indiana. No solid waste storage area of desired size.		Potential aerodynamic plume downwash and possible need for tall stacks because of bluff heights. Other nearby SO_2 emission sources (Olin Corporation's Doe Run plant, Applicant's Mill Creek plant, Kentucky Solite Corporation's plant) would be additive. In Jefferson County, where SO_2 already exceeds primary standards, easterly winds could cause cooling tower and stack drift to affect Brandenburg Potential for cooling tower-induced fogging and icing on highways and structures. Winds from southwest-west (19% of time annually) would carry effluent into Jefferson County, which already has SO_2 concentrations in excess of primary ambient air standard.	Major portion of site is free of buildings and is in farmland, so that few natural important terrestrial or aquatic habitats are likely to be present in development area. Area would derive economic benefits from plant development.	A bluff area along Flippins Run may harbor endangered plant species. Development at east end of site (Olin Corporation's Doe Run plant) and a residential-estate type development to the southeast are likely to increase probability of public opposition. Public opposition highly likely because of potential impairment of air quality.
ighly of karst ississip- ore sub- ing. problems , incog- , and ntami- d solid	Elevation is advantageous in that shorter (less expensive) stacks can be used.	Development costs likely to be very high due to location away from river (necessity of building a rail spur, a pump head and a line for conveyance of cooling water, and a water storage reservoir); distance from existing kV line (16 miles); karst topography (difficulty in obtaining sound foundations); and rolling topography (requirement of extensive grading).	Diffusion characteristics of an upland site make use of shorter stacks possible and reduce probability of cooling tower-induced fogging and icing on nearby roads and structures.		Since most land is in idle oldfield or low-intensity agriculture, site development would not be likely to have adverse effects on terrestrial ecology.	A transmission line (not Applicant's) crosses the site.
river ssitate to over- trapping	Costs would be comparatively low because of location near river and highly favorable topography and soil conditions, which factors allow for: direct access to cooling water and barge transport; good drainage; and good foundation conditions. Size and levelness also cut costs. Kentucky 36 provides easy access to site.	Coal would have to be conveyed over or under Kentucky 36, which is heavily travelled and densely populated.	Ambient air quality is good, with concentrations generally below the secondary ambient air quality standards. Only two other major sources of SO_2 are in area, and prevailing winds generally would not be conducive to interaction of plumes from proposed plant with these.	Very high (400-430 feet) bluffs on either side of the river would necessitate use of very tall stacks to overcome aerodynamic plume downwash and trapping in valley. Winds from east or west would cause ground level concentrations of the proposed plant to be additive. Kentucky 36 and Indiana 56, which run parallel to the river near the site, might be subject to fog induced by cooling towers. Bluffs adjacent to site would be subject to fogging.	Because the area is fully cleared, there would be few impacts on area wildlife because no natural habitat would be destroyed.	Site development would preclude present agricultural land use (land is prime agricultural land). There are residences along Kentucky 36 that, though not necessarily requiring relocation, would be impacted by plant operation. Negative aesthetic effects on an area heavily travelled and densely populated would cause a great deal of public opposition.
over developed cle ld be - e site ropa- mena in make uble ctures.	Transmission line could easily be run into 345-kV line 2 miles from site.	Costs would be high because of the rough terrain and possible extensive solution-channeling of underlying rocks, particularly since large-scale grouting may be required for foundations and for the dam of the emergency water reservoir. Solution channeling would also make it difficult to protect the ground water resource of the area from leakage from the reservoir and ash storage pond. Construction of the necessary rail spur over 5 miles of rough terrain would also be costly. Besides the high initial capital costs, there would be high annual costs associated with pumping water over substantial height and distance.	Since site is high upland, its diffusion characteristics are such that stack heights over 700 feet may not be necessary. Air quality in vicinity is presently good, with pollutant concentrations generally below the secondary standards. SO_2 emissions in the area for 1973 were comparatively low, with only one major source within 20 miles of the site. The prevailing winds are south through west, which would carry effluent away from the Louisville and Jefferson County areas. Because site elevation is comparatively high, cooling tower-induced fogging and icing on nearby roads and structures would be avoided.		As site is used for crops and grazing, no unique habitats would be newly disrupted.	At least five residences would be affected by site development. Wildlife habitat in ravines and creek bottoms would be adversely affected. Siltation and runoff from site could adversely affect Harrod's Creek unless protective measures were employed. Two orchards on the east end of the site would be disrupted or destroyed.

TABLE 5 (Continue

Site	LOCATION		SIZE, TOPOGRAPHY, AND GEOLOGY		SITE DEVELOPMENT	
	Advantages	Disadvantages	Advantages	Disadvantages	Advantages	Di
TRIMBLE COUNTY	Location on the Ohio River allows easy access to cooling water supply and barge facilities. Site is located only a few hundred yards from 345-kV line. Near the growth area of the Applicant's service area.	Site is in an area of high rural aesthetic appeal, and is also directly across the river from the proposed PSI Marble Hill nuclear plant. There would be strong local public opposition to construction and operation of another facility in this area.	Size and topography distinctly advantageous: over 2,300 acres could be developed, including two ravines highly suitable for solid waste disposal areas; 600 acres are nearly level, and provide adequate land for development of proposed facility. Site has good drainage. Alluvium underlying the site is probably sand and gravel with interstratified silt and clay lenses; these materials would provide adequate foundation support for plant structures.	The 300- to 350-foot bluffs on either side of the river at the site would necessitate use of very tall stacks to overcome aerodynamic downwash and plume trapping in the valley.	Barge docking facilities on Ohio River provide easy delivery of coal and other materials. Proximity to the river allows low-cost access to cooling water supply. The ravines are especially advantageous for development as solid waste disposal areas. Applicant's 345-kV line passes within a few hundred yards of site; the transmission corridor required would therefore be short (consequently, less costly and less disruptive environmentally).	Some costs in road up relocations: Bedford, Ke would have and a local along the b would have Corn Creek rerouted to for ash dis Several gre would have
WEST POINT	Location on flood plain affords easy access to cooling water supply and barge facilities. Site is located advantageously with respect to rail and highway access and within 6 miles from Applicant's 345-kV line.	Flood plain and low elevation makes site subject to plume downwash and also to flooding hazards. Area already receives heavy SO_2 and particulate emissions.	Site offers 900 acres of nearly level flood plain, with soil conditions suitable for plant development.	Area is low and therefore subject to flooding and soil wetness. The site offers no areas suitable for solid waste disposal, and its size would allow little flexibility in plant layout. The necessary plant structures and coal and limestone storage and handling facilities would be an extremely "tight fit" on this site.	All transport access very good: barge docking facilities on the Ohio River would provide easy delivery of coal and other materials. A rail line on the south end of site is good transport alternative. Good highway access from State Highway 835 and U.S. 31W-60 at southeast end of site. Site is less than 6 miles from 345-kV line and less than 1 mile from an existing 154-kV line.	Extensive f and filling required b tion. An existing may interfe There are n onsite soli
WESTPORT	Flood plain location allows direct access to river for cooling water supply and barge facilities. Site is less than 25 miles from Louisville load center. Near the growth area of the Applicant's service area.	Site is very close to Westport. Valley locations would require use of tall stacks to overcome aerodynamic downwash; location also makes potential cooling tower-induced fogging and icing a problem for nearby highway and structures.	The site has good drainage and alluvial deposits that would provide adequate support for power plant foundations. Its elevation is favorable; the plant grade would be well above the highest recorded flood stage.	Bluffs 300 feet high on either side of river would require use of tall stacks. The site is small (a little over 500 acres), which would limit site layout flexibility and probably necessitate transport of solid wastes offsite.	Site offers direct access for barging of coal and other materials, and a supply of cooling water. Good highway access is provided by State Highway 524 from U.S. 42. Site is less than 10 miles from Applicant's 345-kV line. Elevation and relief are favorable for development (no extensive flood protection works would be needed).	Site is sma solid waste would be p impossible.

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TABLE 5 (Continued)

SITE DEVELOPMENT		AIR QUALITY CONDITIONS AND EFFECTS		LAND USE - ECOLOGY AND EFFECTS	
Advantages	Disadvantages	Advantages	Disadvantages	Advantages	Disadvantages
Barge docking facilities on Ohio River provide easy delivery of coal and other materials. Proximity to the river allows low-cost access to cooling water supply. The ravines are especially advantageous for development as solid waste disposal areas. Applicant's 345-kV line passes within a few hundred yards of site; the transmission corridor required would therefore be short (consequently, less costly and less disruptive environmentally).	Some costs would be incurred in road upgrading and some relocations: roads from Bedford, Kentucky to the site would have to be upgraded, and a local road on the site along the base of the bluff would have to be rerouted. Corn Creek would have to be rerouted to provide space for ash disposal ponds. Several graves on the site would have to be relocated.	Ambient air quality in the site area is generally good, with only one major source of pollutants 10 miles northeast (Clifty Creek Power Plant). SO_2 emissions for 1973 in the area were low.	Since plant site is in valley with 300- to 350-foot bluffs on either side, very tall stacks would be required to overcome aerodynamic downwash and plume trapping in the valley. Fogging and icing may occur, though they would have little effect on land uses or roads in the vicinity. Emissions would be additive with PSI Marble Hill plant across the river.	The economy and tax base of the area would be stimulated and improved by plant development.	Agricultural use of 600-700 acres would be precluded by plant development. Several residences and farm buildings would have to be removed from the site. The relocation of the Corn Creek channel will involve destruction of the associated aquatic habitat and woodland along the stream banks. A valuable wetland area would also be affected. Woodlands and upland wildlife habitat in the ravines would also be destroyed. Because site is currently a very attractive rural area, public opposition to a power facility would be great, particularly since PSI is seeking to locate their proposed Marble Hill nuclear plant directly across the river. Presence of these facilities would permanently affect life style and air quality in the area.
All transport access very good: barge docking facilities on the Ohio River would provide easy delivery of coal and other materials. A rail line on the south end of site is good transport alternative. Good highway access from State Highway 835 and U.S. 31W-60 at southeast end of site. Site is less than 6 miles from 345-kV line and less than 1 mile from an existing 154-kV line.	Extensive flood protection dikes and filling would probably be required because of low elevation. An existing water well field may interfere with development. There are no areas suitable for onsite solid waste storage.		Location in river valley makes site subject to aerodynamic plume downwash, requiring tall stacks. SO_2 and particulate missions within 25 miles of site are presently heavy (Applicant's Mill Creek, Cane Run and Paddy's Run plants, and PSI New Albany plant). Prevailing winds (south through west) would compound existing air quality problems downwind in Jefferson County. U.S. 31W-60, a heavily travelled road in the site vicinity, could be affected by fogging from cooling tower plumes.	Plant development would provide beneficial economic stimulus to community of West Point. Use of land would have very little adverse effect because quality of land is only marginal for farming; existing residences are low-value; area south is part of Fort Knox and is therefore largely undeveloped with nothing to disturb.	
Site offers direct access for barging of coal and other materials, and a supply of cooling water. Good highway access is provided by State Highway 524 from U.S. 42. Site is less than 10 miles from Applicant's 345-kV line. Elevation and relief are favorable for development (no extensive flood protection works would be needed).	Site is small, and locations of solid waste storage areas onsite would be problematical, maybe impossible.	Air quality in site vicinity is good, with pollutant concentrations generally below secondary standards. SO_2 emissions in area are not heavy, and the nearest major source (Clifty Creek Power Plant) is 16 miles to the north-northeast. Because predominant wind direction is south through west, plant effluents would generally be carried away from Louisville and Jefferson County.	Bluffs would create potential for plume downwash, necessitating use of tall stacks. Cooling tower-induced fogging and icing may occur on highway and local structures, particularly on the bluffs adjacent to the site.	Site has been used for agriculture, so that no important terrestrial or aquatic habitat would be directly destroyed by site development.	Community of Westport contains approximately 80 houses and is a base for Ohio River pleasure boating. There are also residences along Covington Ridge Road, which runs through the site. The necessity to relocate some of these homes would be disruptive and would meet with strong public opposition. Construction of new transmission line for 10 miles across woods and rolling topography would adversely impact terrestrial habitat as well as area aesthetics, and may interfere with some land uses. Transport of solid waste offsite, either overland or by barge, would cause some adverse environmental impacts.

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water supply and barge transportation, (3) nearness of transmission line tie-in, (4) low sulfur dioxide concentrations in the area, and (5) a location in the northern portion of the Applicant's service area.

ALTERNATIVE PLANT SYSTEMS

To design a 2,340-MW power generating plant for the Trimble County site, the Applicant conducted an engineering alternatives study to design a plant that would:

- Operate with a high degree of reliability
- Be economically feasible
- Be in accordance with all applicable federal, state, and local engineering and environmental regulations

The alternatives analysis considered the following major plant systems and structures:

1. Cooling system
2. Atmospheric pollutant control system
3. Plant water use system
4. Intake and discharge structures
5. Solid waste disposal system
6. Transmission line facilities

Other plant components, such as the coal handling facilities, barge docking and unloading facilities, noise reduction devices, etc., were also evaluated. As the analyses of these plant components were completed by the Applicant and its design firm, they were submitted to the Consultant and the EPA for review. On the basis of this review, an assessment was conducted of the impact of the various alternatives, including the preferred design chosen by the Applicant. Because the major environmental impacts of the plant will be associated with the six major systems and structures named above, they were the focus of the environmental impact analysis. Detailed descriptions of the alternatives and the proposed plant design are presented in Sections 3.4 and 4.0 of the supporting report. The following is a summary of the major plant systems and the various alternative designs considered.

Cooling System

The proposed Trimble County Generating Plant will use steam to generate the electrical energy that the plant is designed to produce. Water will be drawn from the Ohio River and turned to high-pressure, superheated steam (thermal energy) in coal-fired steam generators. This steam will then be sent to the turbine generators, where the thermal energy of the steam will be converted to mechanical energy, which in turn will be converted to electric energy in the power generators (see Figure 2). After giving up its usable heat energy, the steam will be sent to the steam condensers and converted to water; this water will then be reheated and sent to the steam generators to begin the cycle once again.

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In order to condense the steam into water, water will be circulated through the condensers (where heat will be transferred from the steam to the water), cooled, and then recycled. There are a number of ways the water cooling process (called waste heat rejection) can be accomplished:

- Man-Made Lakes - warm water is discharged to the lake where the heat dissipates through evaporation
- Spray Ponds or Canals - warm water is discharged to a long, narrow pond or canal from a distribution pipe equipped with a series of spray modules. These modules "atomize" the water as it is discharged, allowing its heat to dissipate before the water enters the receiving pond or canal
- Cooling Towers - warm water is sent to a structure in which the water is broken into films and air is passed through these films at high flow rates. As the air passes through the water, it picks up the water's heat load. The heated air is then discharged to the atmosphere

The engineering, cost, and environmental pros and cons of each of these alternatives are presented in Table 6. The Applicant proposes to use natural draft cooling towers for the Trimble County Generating Plant.

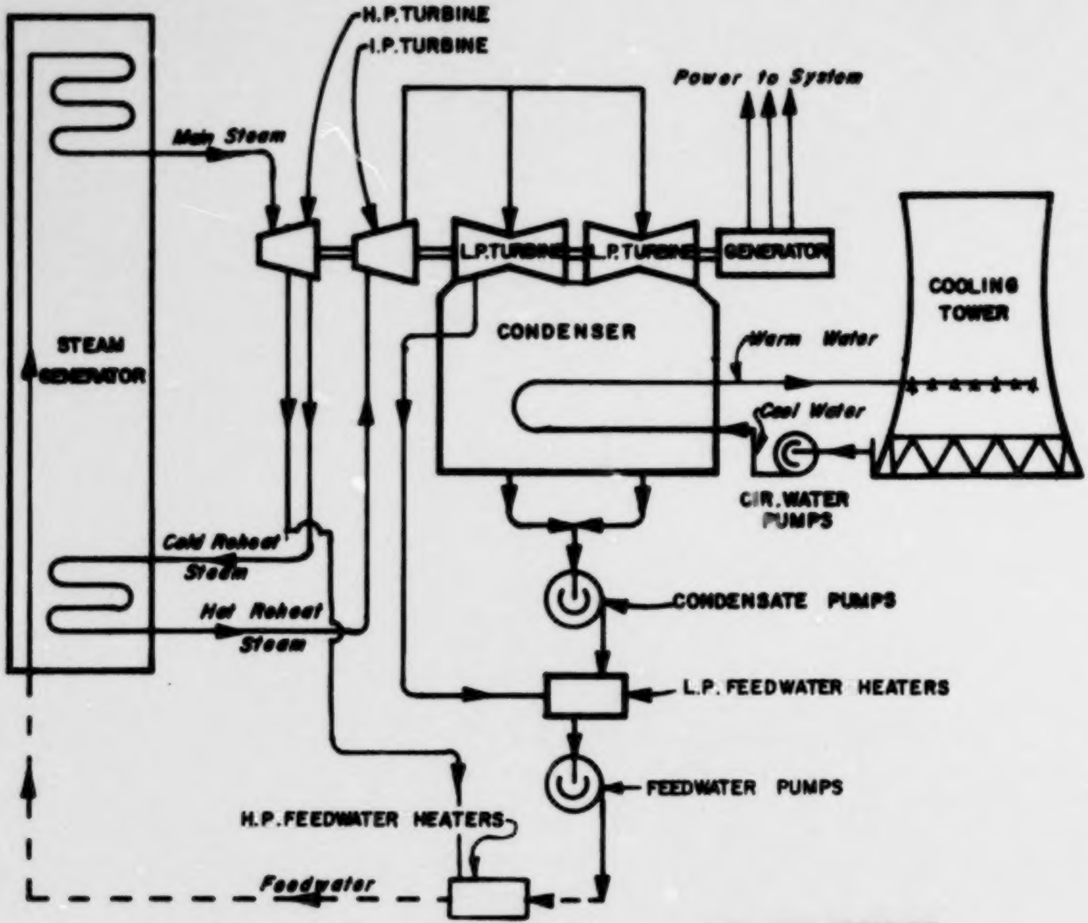
Atmospheric Pollutant Control System

When coal is used to fire the steam generators, three major air pollutants result: sulfur dioxide (SO_2), total suspended particulates (ash), and nitrogen dioxide (NO_2). These pollutants are released to the atmosphere through the plant's chimneys. The amount of these pollutants that can be so released is regulated by both federal and state laws (described in this summary under "Impacts of the Proposed Project"). The amount of these pollutants that is emitted as a result of burning coal depends on several factors:

- The sulfur and ash content of the coal being burned
- The number of generating units (a total of four for the proposed project) that are in operation
- The operating level of each unit (i.e., at what level of design capacity each unit is operating--this typically varies from as low as 25 percent up to 100 percent)

The regulation of air pollutant emissions from a plant is based on the maximum amount of air pollutants that would be produced when:

- The coal being burned contains the highest sulfur content that could be expected in the type of coal that the Applicant has (or will) contracted to buy for the plant
- All four generating units are in operation
- Each unit is operating at maximum (100 percent) capacity



H.P. = HIGH PRESSURE
I.P. = INTERMEDIATE PRESSURE
L.P. = LOW PRESSURE

DATE	FLUOR PIONEER INC.	DESIGN GUIDE
	LOUISVILLE GAS & ELECTRIC COMPANY TRIMBLE COUNTY PLANT SITE	SHT OF
	STEAM ELECTRIC SYSTEM CYCLE	FIGURE 2

FORM C-313 10/74

TABLE 6

WASTE HEAT REJECTION SYSTEM

System	Advantages	Disadvantages
ONCE-THROUGH COOLING SYSTEM		Causes localized changes in temperature distribution of source of water. Relatively high ambient source water temperatures need to be lowered artifically. Federal regulations discourage once-through cooling systems.
CLOSED CYCLE SYSTEMS		
Man-Made Lakes	No effect on present aquatic habitat.	Requires between 2,340 and 11,700 acres; the site has only 1,000 acres (not including ravines).
Spray Ponds or Canals	Requires fewer acres than man-made lake, with same environmental advantage.	Tends to cause local fogging. Has not been used on large scale in areas that are geographically and meteorologically similar to the Trimble County site.
Dry Cooling Towers	Eliminates evaporative losses of cooling water. Requires fewer acres, compared to lakes or canals. No fogging or icing problems. Less damaging to aquatic habitat than once-through systems.	Turbine exhausts at high temperatures and high pressures; this is inefficient for cycle operation. Domestic turbine vendors restrict their turbine exhaust pressures to below those economically achievable with present dry tower design.
Mechanical Draft Towers		
Rectangular	Requires fewer acres than lakes or canals. Lower initial cost than round mechanical draft towers. Less damaging to aquatic habitat than once-through systems. Lower cost than natural draft towers.	Significant ground level fogging and icing. Requires more land than round mechanical draft towers. Has less desirable plume rise and dispersion characteristics than round mechanical draft towers.
Round	Better plume rise and dispersion characteristics than rectangular mechanical draft towers. Requires less land than rectangular mechanical draft towers.	Higher initial cost than rectangular mechanical draft towers.
Wet/Dry Mechanical Draft Towers	Helps minimize water consumption by limiting evaporation. Allows attainment of turbine back pressures acceptable to domestic turbine vendors.	Higher initial cost than round mechanical draft towers. More expensive to operate than round mechanical draft towers. Has not been used extensively.
Hyperbolic Natural Draft Tower	Disperses plume at a very great elevation compared to other tower types. Trapping of water droplets in air is minimized. Does not require more site area than other tower types, despite its overall size. Operating cost generally lower than other tower types.	Greatest visual impact. Higher initial cost than other tower types.

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The Applicant intends to burn Alston #1 coal in its proposed Trimble County Generating Plant. In its raw (untreated) state, this coal contains up to 4.29 percent sulfur and 16.93 percent ash.

In order to keep the amount of air pollutants released by the plant in conformance with state and federal regulations, the Applicant must use devices to control the sulfur dioxide, particulates, and nitrogen dioxide that will be released by the burning of coal in the plant. Devices to control the sulfur dioxide are called scrubbers; a variety of devices are available to remove the particulates (see Table 7). Nitrogen dioxide is controlled by the design of the steam generators. Each of these types of devices is available in several different designs. These designs, and their advantages and disadvantages, are summarized in Table 7. The Applicant proposes to use a wet limestone scrubbing system and electrostatic precipitators in its Trimble County Generating Plant. The type of nitrogen dioxide removal system to be used in the plant will be determined by the boiler manufacturer.

Plant Water Use System

The proposed Trimble County Generating Plant will use water for four main purposes: (1) cooling, (2) plant processes (make-up water for the condenser, water for the sulfur dioxide removal system, water to sluice ash from the boiler furnaces, and water for cleaning and other miscellaneous uses), (3) domestic consumption and sanitary facilities, and (4) construction uses (concrete batching plant, drinking purposes, sanitary facilities, fire protection, hydrotesting, soil compaction, and dust suppression). Plant construction and operation will produce five types of wastewater:

1. Cooling system wastewater (cooling tower "blowdown")
2. Plant processes wastewater
3. Solid waste disposal area precipitation runoff
4. Site precipitation runoff
5. Domestic and sanitary wastewater

Two alternative sources of water are available at the plant site: the Ohio River and ground water from wells. Wastewater management options available to the Applicant were the following:

1. Discharge to the Ohio River
2. Discharge to land surface for ground absorption
3. Disposal ponds (with recycle)
4. Complete use of all wastewater (zero discharge to the environment)

Of the wastewater discharges that will result from the plant, plant process wastewater has the highest potential for environmental pollution. Early in the alternative design study, the Applicant decided that all plant process wastewater would be handled by a zero discharge design. The only wastewater that would be returned to the environment would be the cooling tower blowdown and precipitation runoff from the site and solid waste disposal areas.

The only water source large enough to supply the amount required by the plant for major uses (cooling, plant processes, fire protection, hydrotesting, and soil compaction) is the Ohio River. The remaining plant water

TABLE 7

ATMOSPHERIC POLLUTION CONTROL SYSTEMS

System	Advantages	Disadvantages
	SO_2 CONTROL	
Coal Beneficiation, (mechanical washing, magnetic separation, chemical separation)	Reduces amount of waste resulting from the removal process	Mechanical washing depends on availability of sufficient water near mine Magnetic and chemical separation still in laboratory testing stage Most beneficiated coal would not allow emissions standards to be met without other control methods
Solvent Refined Coal	Low in ash and sulfur	Still in development stage Very expensive and not available in required quantities
Flue Gas Desulfurization (FGD)		
Wet lime or limestone scrubbing	Can remove up to 90% of sulfur from flue gases Least expensive and most reliable of FGD processes now in operation	Results in an insoluble waste product, calcium sulfite/calcium sulfate, which requires a large area for disposal Potential ground water problems associated with waste disposal Potential for some scaling or plugging of scrubber
Double alkali scrubbing	Reduces scrubber scaling and plugging problems Has been used successfully for industrial boilers	Waste product contains sodium salts, with potential for water pollution Loss of reactant (sodium salts) in waste makes the process more expensive than lime/limestone scrubbing Has not been used in this country at a coal-fired generating plant larger than 20 MW

TABLE 7 (Continued)

System	Advantages	Disadvantages
	SO_2 CONTROL (Continued)	
Magnesium Oxide Scrubbing	Process produces small amounts of waste, recycles material used as reactant, and yields potentially marketable by-product Suitable for areas with limited sludge disposal space and a potential market for the sulfur by-product If cost can be defrayed by assumed sales revenue, may prove to be less expensive scrubbing method over life of plant	Erosion, dust emissions, and other problems More expensive than lime/limestone scrubbing Presently more expensive on a first cost and operating costs basis than previous two methods May involve problems in marketing the by-product because of the large quantities produced Process presently undergoing testing and modification on large-scale demonstration units
Catalytic oxidation	Process produces small amounts of waste, recycles material used as reactant, and yields potentially marketable by-product If cost can be defrayed by assumed sales revenue, may prove to be less expensive scrubbing method over life of plant	Difficulty in producing high temperatures for the dry process Corrosion and cooler plugging in acid section of system Contamination by fly ash may adversely affect the life of the catalyst Capital and operating cost higher than for lime/limestone scrubbing Additional marketing problems associated with weak sulfuric acid by-product Process at demonstration plant stage

TABLE 7 (Continued)

System	Advantages	Disadvantages
	SO$_2$ CONTROL (Continued)	
Sodium scrubbing	Process produces small amounts of wastes, recycles material used as reactant, and yields potentially marketable by-product If cost can be defrayed by assumed sales revenue, may prove to be less expensive scrubbing method over life of plant Presently undergoing full-scale testing at several coal-fired facilities	Life-time operating and labor costs are higher than for lime/limestone scrubbing
	PARTICULATE CONTROL	
Electrostatic Precipitator	Up to 99.6% removal of fly ash, reliable, low operating and maintenance costs	
Wet Scrubber - Venturi Type		Excessive energy consumption, large volumes of water, produces waste sludge and associated disposal problems
Fabric Filter (Bag House)		Larger space requirements, limited design temperatures, and higher maintenance costs
Mechanical Separators (Cyclone)		Low operating efficiencies, necessitating the supplementary use of one of the other kinds of precipitators. Hence, higher capital and operating costs
	NO$_X$ CONTROL	
Water Injection		High loss in thermal efficiency makes this method expensive in times of rising fuel costs and energy resource scarcity

TABLE 7 (Continued)

System	Advantages	Disadvantages
	NO_x CONTROL	
Flue Gas Recirculation	Easily adapted to coal-firing Produces lowest NO_x levels Easier to control than over-fire air	Much higher capital cost
Over-Fire Air	Like flue gas recirculation, has been used extensively to control steam temperature NO_x is reduced with relatively little capital cost	

requirements will be supplied by wells. Of the wastewater management options, the only one that satisfied the criteria established by the Applicant was a combination of plant process wastewater recycle, cooling tower cold side blowdown to the Ohio River, and site precipitation runoff to the Ohio River.

The alternative water sources and wastewater management options evaluated by the Applicant are described in Table 8. The Applicant's proposed water use design is indicated in the table by asterisks. A diagram of the plant's water use plan, which indicates maximum water use requirements, is presented on Figure 3.

Intake and Discharge Structures

Water being drawn into or discharged from a power plant can affect the ecosystem of the source or receiving water body. The design of the intake and discharge structures can affect the degree of impact that the plant's intake and discharge operations can have. State and federal standards define the intake velocity of the intake structure and also the degree of impact that an intake structure may have on the aquatic environment. The size of the discharge plume and its thermal and chemical content are also regulated. Careful intake and discharge structure design and location are necessary to ensure that these regulations are complied with. Table 9 presents the intake and discharge alternatives evaluated by the Applicant. Asterisks indicate the Applicant's proposed design.

Solid Waste Disposal System

Operation of the proposed Trimble County Generating Plant will result in the production of two kinds of solid waste: a sludge-type waste from the wet limestone sulfur dioxide removal system and ash from coal combustion.

Scrubber waste is produced when sulfur dioxide is removed from the steam generators' exhaust (flue gases). It consists of the solids precipitated during the reaction between the limestone slurry in the scrubbers (one for each unit) and the sulfur dioxide in the flue gas. These solids and the exhausted limestone slurry are collected in the bottom of the scrubber and combined with a clarifier or thickener to form a sludge-type waste.

Ash, a nonburnable component of coal, is produced when coal is burned in the steam generator boiler furnaces. Two kinds of ash result when the coal is burned: "bottom" ash and "fly" ash. Bottom ash, which has a larger particulate size than fly ash, falls to the bottom of the boiler furnaces during the combustion process. Fly ash, which is a very fine particulate matter, leaves the furnaces with the flue gases and is collected by the precipitators (two for each unit).

The amount of these solid wastes that will be generated by the proposed plant is determined by the following four factors:

1. The amount of ash and sulfur in the coal
2. The sulfur dioxide removal efficiency of the scrubber

TABLE 8

PLANT WATER USES

System	Advantages	Disadvantages
WATER SOURCES (Major Water Uses)[a]		
Deep Wells	Water is usually of better quality than river water and requires less pretreatment before use. No impact on aquatic life.	Major plant water requirements, even with maximum water reuse, are too great for this type of source.
Radial Wells	Can extract greater quantities of ground water than deep wells. Water quality better than for river water. No impact on aquatic life.	Water quality is not as high as with deep wells. Initial cost is extremely high. Quantity required is uncertain for life of plant due to plugging problems.
******River Water*	Water quantity required can be met.	Impingement/entrainment of aquatic life.
WASTEWATER DISCHARGE		
Cold Side Cooling Tower Blowdown		
Discharge to disposal pond		Blowdown would quickly overflow any feasibly sized pond on site.
*Discharge to river	Adequate receiving body.	More expensive discharge structure.
Site Runoff		
Routing runoff from retention basin to disposal pond		Requires a pond larger than area available can accommodate. Requires additional pumping and transport equipment.
*Discharge from retention basin to river	Release of runoff is controlled and monitored to ensure quality is acceptable for discharge.	
Plant Process		
*Discharge to disposal pond	No pollutants from plant processes allowed to enter environment.	

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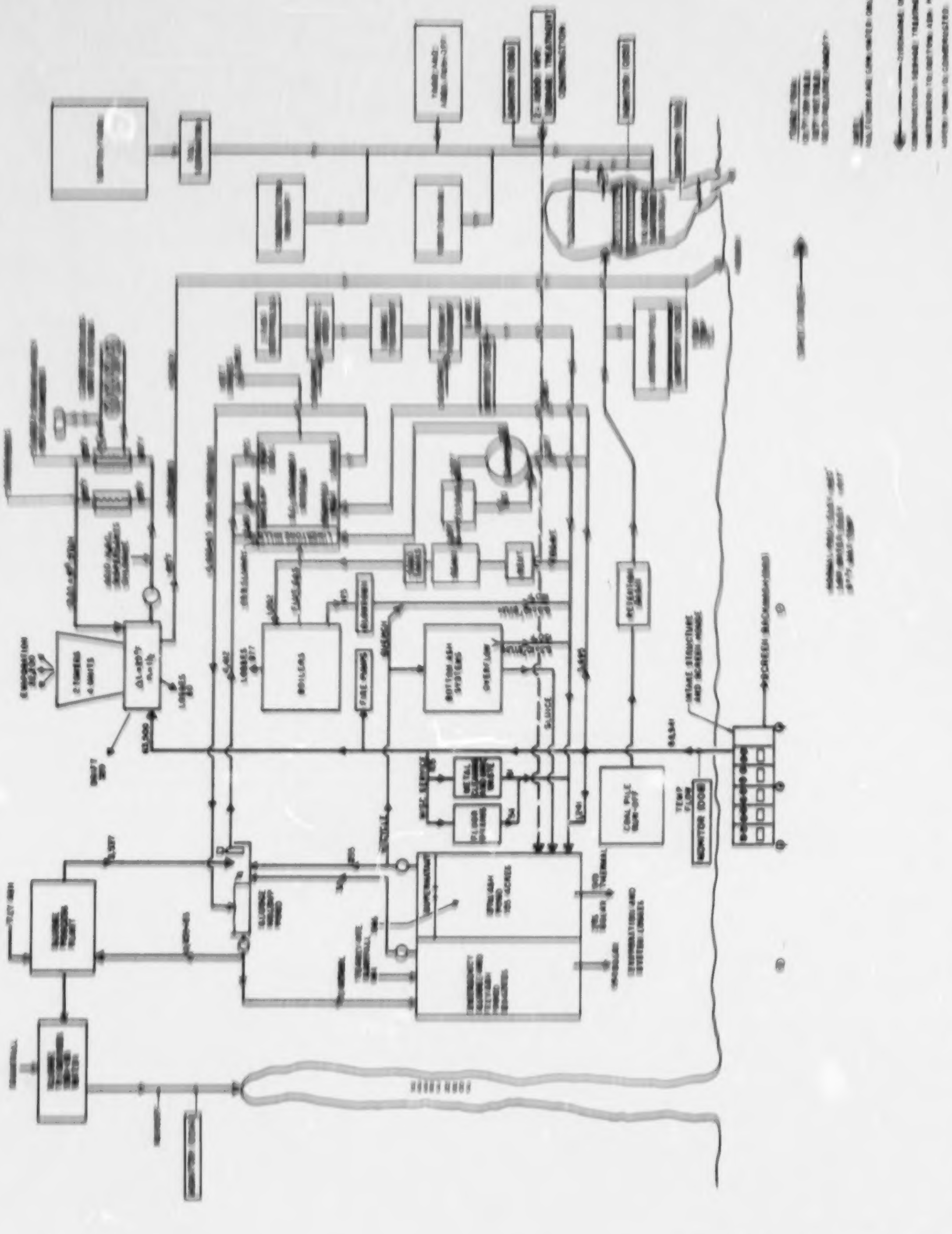
[a] Smaller water requirements will be supplied by deep wells.

* Applicant's proposed design.



LOUISVILLE GAS & ELECTRIC COMPANY
TRIMBLE COUNTY PLANT SITE

STATION WATER USE PLAN
PEAK FLOW

Designed by
FLUOR PIONEER INC.

TMP	3-15-77	JEH	3-18-77			

FIGURE 3

TABLE 9

INTAKE AND DISCHARGE STRUCTURES

System	Advantages	Disadvantages
INTAKE STRUCTURE LOCATION		
Shoreline	Less pump discharge piping required.	Deep excavation required to provide low velocity through trash racks. More costly because of depth of required cut. Approach canal could trap and destroy fish.
*Offshore**	Can be located near cells supporting the coal barge unloader for protection from river traffic and debris. Minimum length of piping to the cooling towers.	Reduced river velocities, caused by mooring cells and unloading facilities, could result in increased siltation around intake structure.
INTAKE STRUCTURE DESIGN		
*Conventional**	Proven reliability.	Impingement and entrainment of aquatic life. Bridge required for service personnel.
Perforated Pipe	Less complicated than conventional structure. Lower construction and operating costs. No impingement of fish. Shorter bridge required because pump is located onshore.	Depth of river at design low water may not be adequate. Large amount of siltation could cause heavy silt intake and clogging of the system. Regular back flushing with water or air and dredging of the area could be required.
DISCHARGE CONDUIT AND STRUCTURE		
Direct Discharge	Less head loss; ability to discharge at higher flood levels than indirect discharge line.	Less thermal dispersion because of location of discharge port near unloading facilities.
*Indirect Discharge**	Discharge port away from unloading facilities.	Greater head loss; more costly.
Open Channel Conduit	Less costly.	
*Buried Conduit**	No interference with surface operations, no visual impact, protection from external conditions, ability to [illegible]	
Pumping	Ability to discharge under any river flow conditions.	More costly.
*Gravity Flow**	Better reliability than pumping.	Discharge is not possible during extreme flood conditions.
	Lower operation and maintenance costs.	Bypass line and additional emergency outlet required.
Above Surface Discharge		Can result in occasional fogging; [illegible] energy dissipation; less mixing and thermal dispersion.
*Below Surface Discharge**	Better mixing and thermal dispersion. Less noticeable.	
*Offshore Discharge**	Helps provide access for dilution water around entire periphery of thermal plume and improve dispersion.	Could cause high surface velocities.
Nearshore Discharge		Reduced river velocities as a result of mooring cells and unloading facilities would result in decreased dispersion capabilities.

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*Applicant's proposed design.

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3. The capacity factor/coal use rate of the plant--that is, the number of hours (per year) of plant operation at a given percent of capacity and coal quality (the higher these numbers, the greater the quantity of solid waste)
4. The ratio of sulfite to sulfate in the limestone used as a reactant in the scrubber

A total of approximately 7,200 acre-feet of bottom ash will be produced during the 36-year life of the plant (approximately 240 acre-feet per year). A total of approximately 154,200 acre-feet of unprocessed fly ash and scrubber sludge will be produced during the same period. These amounts are calculated on the following assumptions:

1. Alston #1 raw (untreated) coal will be burned in the plant
2. Operating characteristics: 60 percent of capacity during the first 20 years of operation for each unit; 25 percent of capacity during the last 10 years of operation for each unit

Scrubber sludge and ash contain chemical compounds that are potentially harmful to the environment. Therefore, they must be disposed of in a manner that prevents these components from entering either the surface or ground water of the disposal area. The traditional method of disposal for ash is a pond lined with clay or other impervious material to prevent leakage or seepage. Disposal of scrubber sludge is a relatively new problem for which several alternatives are available.

The Applicant evaluated basically two kinds of disposal scheme alternatives for the solid wastes to be produced by the Trimble County Generating Plant: an onsite disposal pond for the bottom ash and an onsite landfill type of disposal for the scrubber sludge and fly ash. These disposal schemes and other disposal alternatives are discussed in detail in Sections 3.4.5 and 4.2.5 of the Draft EIS. The following paragraphs provide a summary description of the Applicant's proposed solid waste handling and disposal scheme.

As previously noted, ash produced during power plant operation has traditionally been disposed of in ash disposal or storage ponds. Until recently, most power plants have been small enough that the solid waste resulting from plant operation could be contained in an onsite pond designed for this purpose. However, with the advent of stricter air and water pollution control legislation in the early 1970's, it became necessary for plant systems to be designed so that both atmospheric emissions and wastewater discharges were reduced while at the same time allowing increasing system demands to be met. The result was, among other designs, the use of flue gas desulfurization equipment (scrubbers), high-efficiency particulate removal equipment (precipitators), and zero or low wastewater discharge schemes. While these innovations result in lower pollutant discharges to the environment, they create two problems not previously faced by the power companies: (1) where to store the greatly increased amounts of solid waste produced by the sulfur and particulate removal system, and (2) how to store the plant wastewater so that it could be reused in plant processes and thus not be discharged to the environment. In other words, both kinds of pollution control methods--pollutant removal and zero discharge--resulted in much larger storage area requirements than were previously required for power plant operation.

As previously indicated, the proposed Trimble County Generating Plant, when operated on the parameters indicated on the previous page, is calculated to produce 7,200 acre-feet of bottom ash during the 36-year total operating life of the plant (note: each unit has a 30-year operating life). Unprocessed fly ash and scrubber sludge (which the Applicant proposes to combine for storage purposes) production over the life of the plant will amount to approximately 154,200 acre-feet of material. This means that the Applicant would need a disposal area capable of storing 161,400 acre-feet of solid waste, if the solid wastes were disposed of in an unprocessed state.

In addition, the Applicant would have to increase the size of the ash disposal pond to hold plant process wastewater (approximately 340 gallons per minute, maximum peak flow) and a yearly average rainfall of approximately 550 gallons per minute. In order to provide the plant process systems with adequate water, approximately 1,241 gallons per minute of Ohio River water (maximum peak operating conditions) would have to be added to the pond.

The combined solid waste disposal and plant process water requirements necessitate a storage area much larger than the area available for storage even on the 1,000 acres of land originally purchased by the Applicant for the plant. Two large ravines near the northern portion of the plant's eastern boundary were calculated to be able to provide up to a maximum of 60,000 acre-feet of storage for solid waste. However, the ground and surface water pollution potential of ash and scrubber sludge, plus the large amount of water contained in the scrubber wastes (4,500 gallons per minute, maximum peak operating conditions) make it imperative to treat the waste solids (other than bottom ash) in such a way that: (1) their water content would be reduced before they were stored (and hence allow more water to be reused), (2) their pollution potential would be eliminated, and (3) the 154,200 acre-feet of solid waste material would be reduced to an amount that could be contained by the ravines.

To do this, the Applicant designed a five-part solid waste handling scheme consisting of the following operations:

1. Bottom ash is sluiced from the steam generators and stored, along with the plant process water, in a 155-acre compartment (7,120 acre-foot storage capacity) of a 240-acre onsite disposal pond

2. Fly ash is conveyed pneumatically from the precipitators to a storage silo (3 days's peak fly ash production capacity). This stored fly ash is then conveyed pneumatically to a solid waste process plant located near the two offsite ravines

3. Scrubber wastes are thickened to produce a sludge (20 percent solids by weight). This sludge is then pumped to a holdup pond capable of storing 3 days' peak sludge production. From the holdup pond, this sludge is pumped to the solid waste process plant

4. The dry fly ash and scrubber sludge are combined and mixed with a chemical fixation agent. The resulting solid waste is a stable, nonleachable material suitable for use as landfill in the offsite ravines. Because the chemical fixation agent locks in the chemical components of the combined material, including all of the water remaining in the scrubber sludge, the resulting landfill-type of material can be stored without the necessity of making the sides and bottom of the storage area impervious. This process will reduce the 154,200 acre-feet of total fly ash and scrubber sludge from the facility to 58,600 acre-feet

5. Should the process plant be inoperable, the second compartment, 85 acres in size (2,074 acre-feet of storage), of the onsite disposal pond will provide up to 5 months of emergency storage for the untreated fly ash/scrubber sludge

Figure 4 presents a schematic diagram of the proposed plant site development.

Transmission Line Structures

Table 10 presents the alternative transmission line structures evaluated by the Applicant. The proposed structures are indicated by an asterisk.

PROPERTY LINE
DESIGN NORTH
FUTURE SOLID WASTE PROCESSING AREA
CRUSHER HOUSE
HOPPER
DISCHARGE
DISCHARGE OO1
COAL BARGE UNLOADING
OHIO
DESIGN HIGH WATER ELE
DESIGN LOW WATER ELE
DATUM : U.S.C. & G.S.
NORMAL POOL ELEVAT
SAILING LINE
FLOW

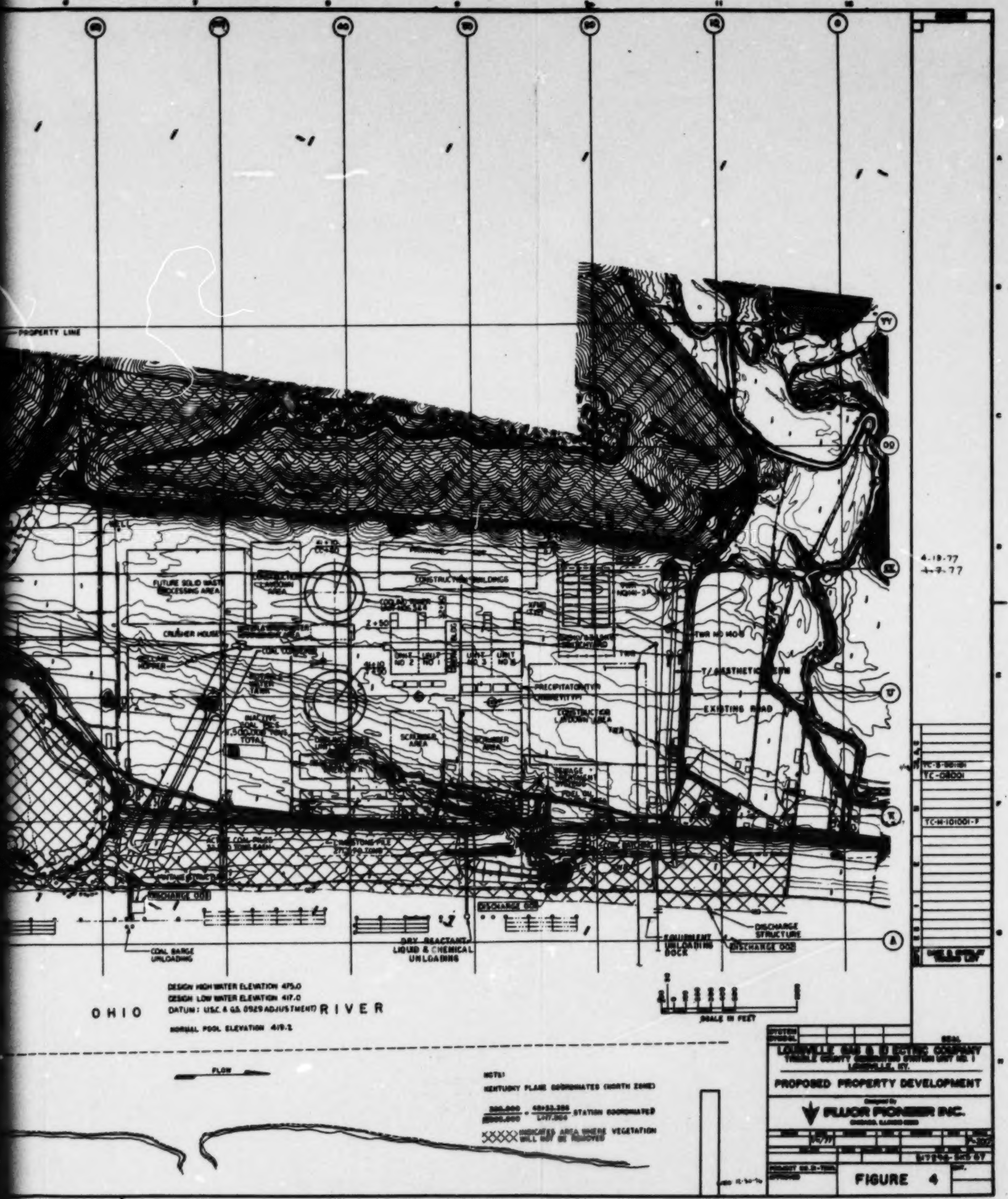
PROPERTY LINE
FUTURE SOLID WASTE PROCESSING AREA
CONSTRUCTION BUILDINGS
CRUSHER HOUSE
COAL CONVEYOR
UNIT NO 2
UNIT NO 1
UNIT NO 3
UNIT NO 4
PRECIPITATORS (TYP)
CONSTRUCTION LAYDOWN AREA
SCRUBBER AREA
INACTIVE COAL PILES 1,500,000 TONS TOTAL
T/AESTHETIC BERM
EXISTING ROAD
DISCHARGE 001
INTAKE STRUCTURE
COAL BARGE UNLOADING
DRY REACTANT LIQUID & CHEMICAL UNLOADING
EQUIPMENT UNLOADING DOCK
DISCHARGE STRUCTURE
DESIGN HIGH WATER ELEVATION 475.0
DESIGN LOW WATER ELEVATION 417.0
DATUM: USC & GS (1929 ADJUSTMENT)
OHIO RIVER
NORMAL POOL ELEVATION 419.2
FLOW
SCALE IN FEET
NOTE:
KENTUCKY PLANE COORDINATES (NORTH ZONE)
STATION COORDINATES
XXXX INDICATES AREA WHERE VEGETATION WILL NOT BE REMOVED
TC-S-00101
TC-08001
TC-M-101001-P
4-19-77
4-7-77
LOUISVILLE GAS & ELECTRIC COMPANY
TRIMBLE COUNTY GENERATING STATION UNIT NO. 1
LOUISVILLE, KY.
PROPOSED PROPERTY DEVELOPMENT
FLUOR PIONEER INC.
SEAL

FIGURE 4

TABLE 10

TRANSMISSION SYSTEMS

System	Advantages	Disadvantages
Eight 138-kV Overhead Lines		Increased visual impact over 345-kV lines Greater use of natural resources in construction of lines, including right-of-way requirements Increased nuisance to population during construction Increased cost to operate lines
*Three 345-kV Overhead Lines	Compared to eight 138-kV lines, less visual and noise impact and reduced use of natural resources	
Underground Oil-Filled Pipe-Type Cable	No visual impact	Recommended only for relatively short lines Limitations on lengths of cable necessitate line splicing Additional pumping facilities required Cost 12 times greater than for overhead line

*Applicant's proposed design.

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THE ENVIRONMENT

INTRODUCTION

For the purposes of assessing the impact of the proposed project on the natural and human environment, a series of studies was conducted to determine the air, land, water, and human characteristics (termed "baseline data") of the area (termed "environmental setting") likely to be affected by the construction and operation of the proposed Trimble County Generating Plant, including the transmission line corridors--one in Kentucky and one in Indiana. The University of Louisville's Water Resources Laboratory was retained by the Applicant to perform the baseline studies of the aquatic and terrestrial ecosystem of the proposed plant site and the Kentucky transmission line corridor (described in Sections 5.2 and 5.3 of the supporting report) and to provide an environmental overview of the Applicant's service area (Section 2.0 of the supporting report). These studies were reviewed and supplemented by the Consultant. The baseline studies of the air, geological, hydrological, and socioeconomic characteristics of the plant site and Kentucky transmission line corridor areas were performed by the Consultant. The Consultant also performed the baseline study of the Indiana transmission line corridor. The results of these studies comprise the remaining portions of Section 5.0 of the supporting report. A summary of the major aspects of the environmental setting of the proposed project follows:

LOCATION AND DESCRIPTION OF THE PROPOSED PROJECT SITE

Plant Site and Kentucky Transmission Line Corridor

Figure 5 shows the location of the proposed plant site in relation to the state of Kentucky. An aerial photograph of the site is presented on Figure 6. The site is located on the Ohio River flood plain (River Miles 570 to 572) and adjoining upland area near the community of Wises Landing in southwestern Trimble County, Kentucky.

The site is principally rural/agricultural in nature and encompasses 2,300 acres. The bottomland portion of the site lies between the Ohio River on the west and upland (bluff) area on the east. The lower-lying sections of this portion of the site are subject to occasional flooding. Most of the bottomland area has been cleared, and a high percentage is used for crop production. The upland portion of the site, which includes two ravines, is quite steep. Most of this area is heavily wooded.

Corn Creek runs near the northern site boundary. Barebone Creek lies to the south of the site and will be crossed by the Kentucky transmission line. Intermittent streams, tributaries to Corn Creek, drain the ravines. An old, heavily wooded cutoff channel ("oxbow") of Corn Creek meanders through the northwestern sector of the site (see Figure 6) creating, along with Corn Creek, a wetland and bottomland woods area valuable to the wildlife on the site.

The main approach to the site is via State Route 754, which enters the flood plain from the southeast and forms the southern boundary of the plant

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site. County Road 1488 diagonally intersects the flat portion of the site before it becomes flush with the bluffs to the east.

The air quality of the site and its immediate environs is generally good. Onsite monitoring of air quality (in 1975) indicated that sulfur dioxide, total suspended particulates, nitrogen oxide, and carbon monoxide concentrations are below state and federal ambient air quality standards. Photochemical oxidant concentrations, however, frequently exceeded the 1-hour ambient air quality standard during the monitoring program.

No rare or endangered plant or wildlife species were found on the site. However, the Corn Creek/oxbow area of the site, in combination with the agricultural fields, provides a highly productive habitat for an abundant wildlife population. The site is also apparently heavily used by migratory waterfowl in the spring when the low-lying agricultural fields are flooded.

The population of Trimble County (5,349 in 1970) is relatively stable. Farming is the primary source of income (58 percent) within the county, followed by government employment (14 percent). Available housing is not abundant and is of a somewhat lesser median value than for the state (12,021 versus $12,850 in 1970). Thirty percent of the occupied housing units in Trimble County lacked some or all plumbing in 1970.

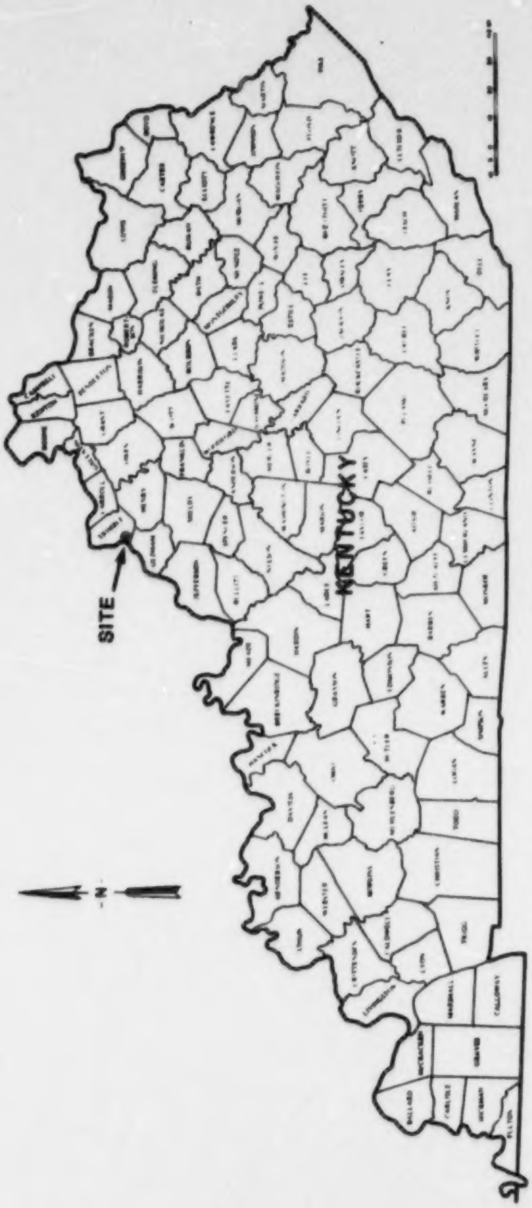
Land use patterns within Trimble County are dominated by farmland (76,691 acres in 1969 out of a total county acreage of 93,440). Tobacco, corn, soybeans, and wheat are the primary crops in the county. The major residential areas in Trimble County are Bedford and Milton. Industrial land uses are minimal. The minimal resource extraction operations within the county are limited to sand and gravel dredging in the Ohio River and county streams.

An archaeological and historical/architectural survey of the proposed Trimble County site was conducted in several phases between April 1975 and November 1976. Nine archaeological sites and one historical site were identified on the property in 1975. None were judged to be significant enough to qualify for nomination to the National Register of Historic Places. During subsequent surveys, other areas of potential archaeological sites on the property were investigated, but no significant archaeological findings occurred.

Two small cemeteries are located within the site boundary. One will be unaffected by plant development. The other will be affected by the construction of the onsite disposal pond. The local undertaker has agreed to relocate the graves to the cemetery that will not be disturbed.

Preliminary Transmission Line Corridor

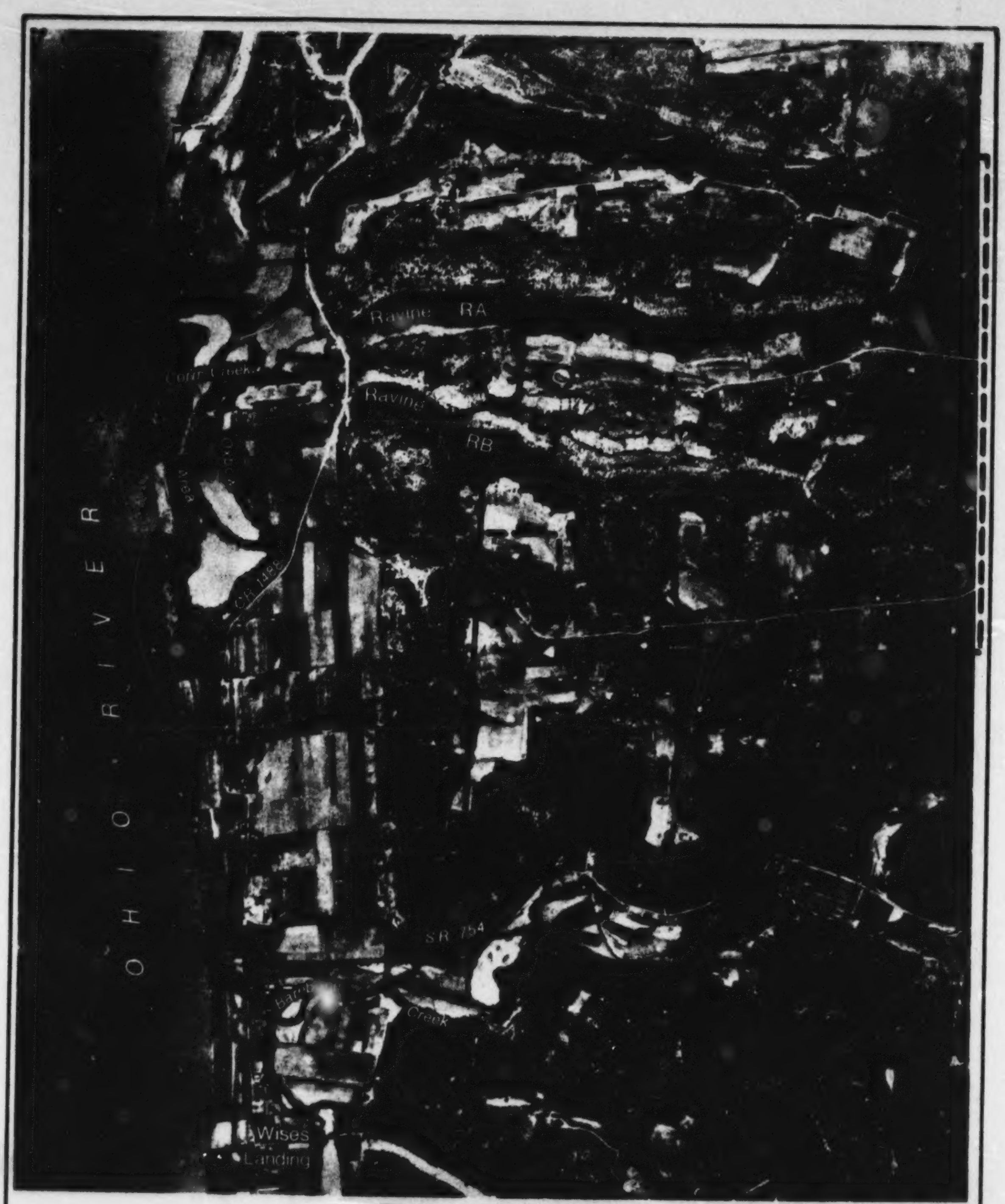
The Applicant has identified its intent to construct a line joining the proposed Trimble County Generating Plant with one of its lines in northern Clark County, Indiana. A preliminary mile-wide corridor for this line is shown on Figure 7, which also shows the various land uses along this preliminary corridor. Because the Applicant has not begun a detailed study of this proposed line, its actual route could vary significantly from that depicted on the map.



LOUISVILLE GAS & ELECTRIC CO.
TRIMBLE COUNTY GENERATING PLANT

PROJECT LOCATION MAP

FIGURE 5



LEGEND:

——— PLANT SITE BOUNDARY

— — — PROPOSED BOUNDARY EXTENTION

N

LOUISVILLE GAS & ELECTRIC CO.
TRIMBLE COUNTY GENERATING PLANT

PROPOSED PLANT SITE

FIGURE 6

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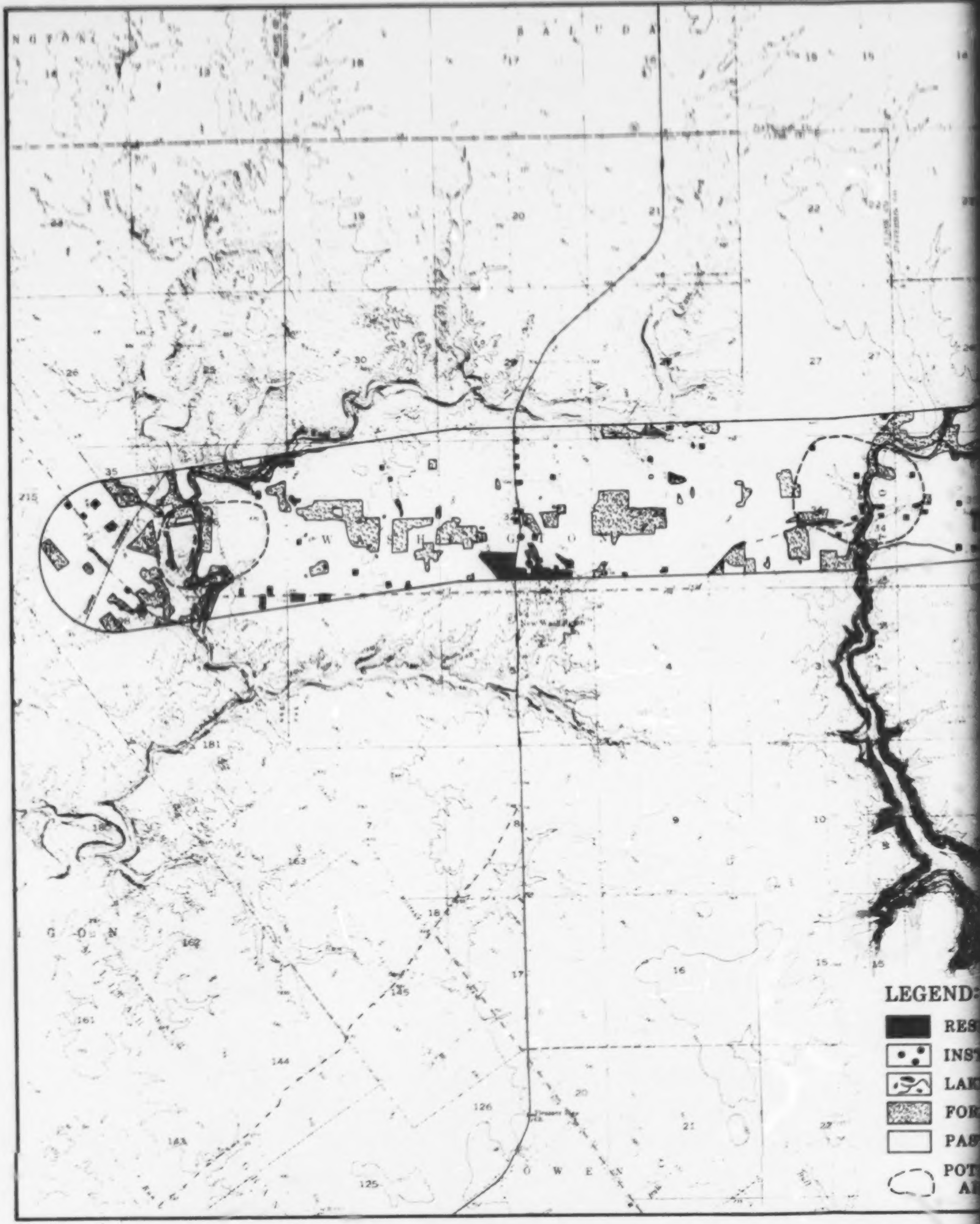

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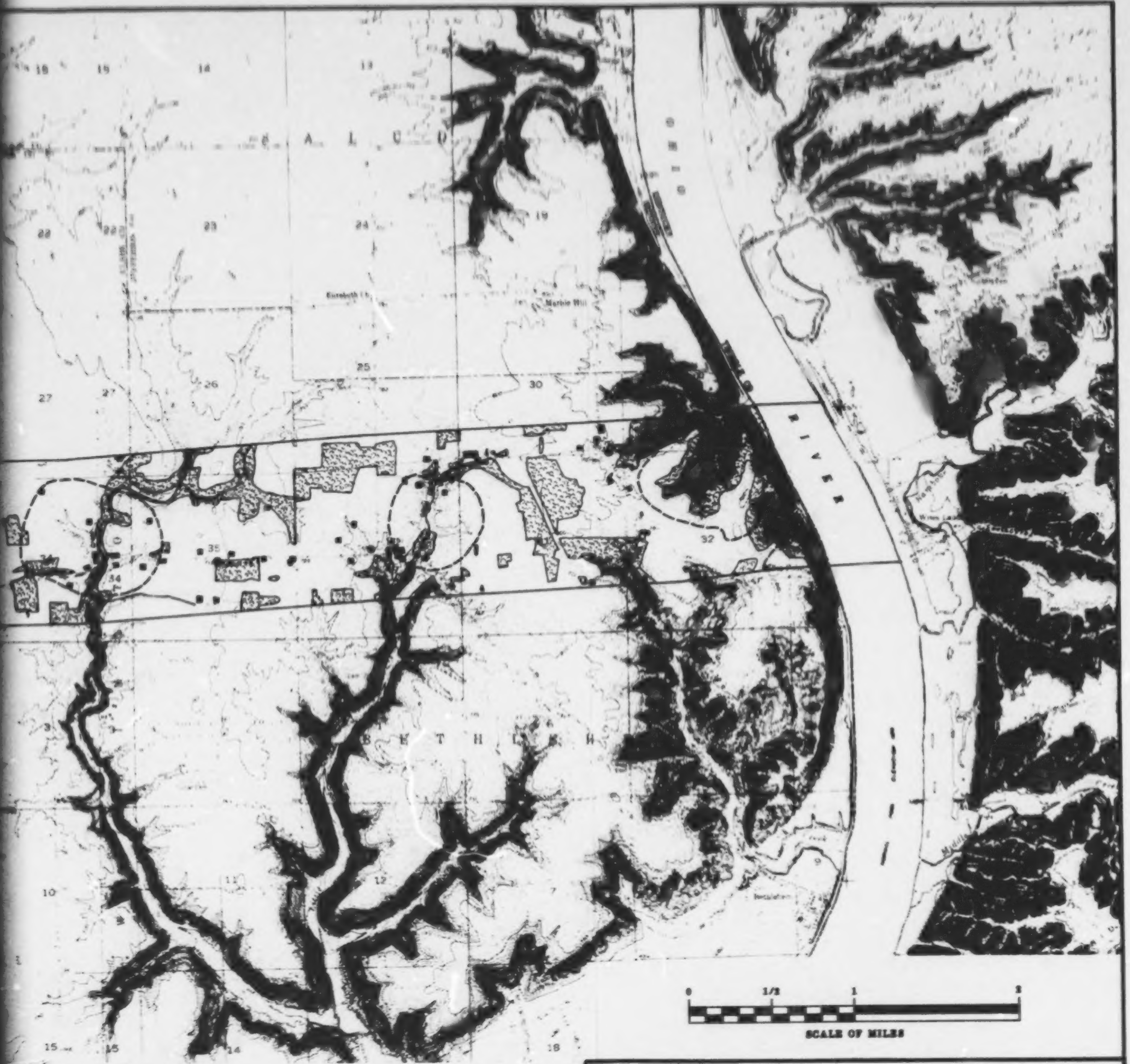

LEGEND:

■ RESIDENTIAL

⁘ INSTITUTIONAL

≈ LAKES & STREAMS

▨ FOREST & WOODLAND

☐ PASTURE, CROPLAND & IDLE LAND

◌ POTENTIALLY SIGNIFICANT ARCHAEOLOGICAL AREAS

-N-

LOUISVILLE GAS & ELECTRIC CO.
TRIMBLE COUNTY GENERATING PLANT

LAND USE OF THE
PRELIMINARY TRANSMISSION LINE CORRIDOR
CLARK COUNTY, INDIANA

FIGURE 7

AESTHETIC QUALITIES OF THE PLANT SITE

The proposed plant site is entirely rural in nature and primarily consists of natural and man-modified natural elements that are visually distinct from each other. The distinct components of the setting provide a pleasing variety, with the steep, wooded bluffs and the straight, wide bank of the river acting as a frame that sets off the flat, cultivated expanse of the bottomland portions of the site. The band of bottomland woods on the site provides further visual diversity. The visual diversity, however, is not unharmonious; the visual components of the site and its environs blend to form a pleasant rural landscape that is unbroken even by the presence of Wises Landing.

SENSITIVE AREAS

Within the site and its immediate environs, three sensitive areas have been identified: Corn Creek, the Corn Creek "oxbow," and the Mahoney property to the north of the proposed site boundary.

As previously indicated, Corn Creek and the oxbow area are heavily used by wildlife. While the habitat this area provides is not unique, insofar as similar habitat types can be found elsewhere along the river, the quality of this habitat makes the area worthy of special attention. The value of the habitat provided by the bottomland woods of the oxbow and Corn Creek is tied to the surrounding agricultural and upland areas. The variety of habitat provided by the combination of agricultural, bottomland woods, streams, and upland wood vegetation types attracts a large number of wildlife species to the area. These species would not be able to find as varied or productive an area elsewhere within the project area (i.e., within a 25-mile radius of the site).

The Mahoney property to the north of the plant site is believed to contain a unique archaeological site. While this site has not been formally investigated, Wilson and Janzen (who conducted the Phase I archaeological/historical investigation of the proposed site), inspected the site and called it "spectacular." Personnel from the University of Louisville Archaeological Survey also discovered an *in situ* site in the highwall along the Mahoney property; they have classified this site as Early Archaic. This site will not be impacted by the project.

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ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

The construction and operation of the proposed Trimble County Generating Plant will affect the air, land, wildlife, water, and people of the site area. Impacts to the land and water will be confined to the site and its immediate environs. Impacts to wildlife will be primarily limited to those species residing on or near the site; however, migrating waterfowl that presently use the site as a stopover point will also be affected by the proposed project. Impacts on the air and people will be experienced over a larger geographical area (within roughly a 25-mile radius of the site). Many of the potential adverse impacts of the proposed project will be reduced by proposed engineering, construction, and operation practices; some potential impacts will be eliminated. Many of the impacts of the plant on the people of Trimble County and other areas (including other counties in Kentucky and Indiana) will be beneficial; some will not. These potential and projected impacts on the project area are described in detail in Section 6.0 of the supporting report. Measures that will be used to reduce or eliminate potential or projected impacts of the project are described in Section 7.0 of the supporting report.

Preliminary discussions about the proposed project with individuals and with state and federal agencies (other than the EPA), as well as a preliminary public hearing, indicated that the major area of public and official concern was air pollution. Other areas of concern developed during the EIS process. These areas were (1) the abundant wildlife on the proposed site and the valuable wildlife habitat provided by the site's wetlands and bottomland woods area; (2) the disruption of the rural character of the site area by the construction of a large industrial complex; (3) the effect of the plant on local ground water; and (4) the potential toxicity to aquatic organisms of the cooling tower blowdown. As a consequence, these areas were given special emphasis during the analysis process.

Several special studies were conducted in order to estimate as precisely as possible the impacts of the plant on air and water quality and aquatic organisms and to provide for measures to reduce these impacts. Several plant design changes were also made during the course of the study to reduce projected impacts of the plant on wildlife, surface water quality, and air quality. Measures to mitigate (reduce or eliminate) potentially significant impacts were also developed. In addition, the National Pollutant Discharge Elimination System permit drafted for the project (a copy of which is contained in Appendix T of the supporting report) contains a set of environmental conditions and required studies that are designed to prevent or to detect and mitigate potentially significant impacts to the air and water of the site area.

The following is a summary of the projected potential impacts of the proposed project. Because air pollution is the most sensitive issue regarding the operation of the facility, as well as the area most stringently regulated by federal and state laws, it is given a more detailed summarization here than other potential kinds of environmental impacts, which are also more easily summarized than air pollution considerations.

IMPACT OF THE PROPOSED PLANT ON AIR QUALITY

The impact of plant flue gas emissions (which contain the major pollutants sulfur dioxide, total suspended particulates, and nitrogen dioxide) were determined by computer modeling of the plant emissions; this modeling included a consideration of the meteorological conditions characteristic of the plant site region, the topographic characteristics of the plant site region, and the pollutant levels expected to be already present in the plant site region at the time Unit 1 of the Trimble County Generating Plant begins operating.

As noted earlier in this summary, air pollutant emissions from the proposed plant must be kept at or below levels defined by federal and state air quality regulations. There are three sets of these regulations: (1) federal and state Ambient Air Quality Standards; (2) federal and state New Source Performance Standards; and (3) federal regulations for Prevention of Significant Deterioration of Air Quality. The second and third set of standards are designed to ensure that the existing air quality of an area is not significantly degraded.

To understand the application of these regulations to the proposed plant, the following background information is necessary. The Ambient Air Quality Standards are divided into the following two categories:

1. Primary Standards - these standards are intended to protect public health by applying a "margin of safety" limitation to the levels of air pollutant concentrations that may exist in an area
2. Secondary Standards - these define the levels of air pollutants that must be maintained to protect the public from the known or anticipated adverse health effects of the pollutants. That is, concentrations of those pollutants controlled by the Ambient Air Quality Standards are known or anticipated to be harmful when they exceed the levels defined by the Secondary Standards

Table 11 presents a list of the Ambient Air Quality Standards. Note that the standards are based on the average concentration of each pollutant, measured in micrograms per cubic meter ($\mu g/m^3$) during several different time periods. These standards apply to pollutants measured at ground level, rather than at the point (stack or chimney) where they are emitted.

New Source Performance Standards were instituted in 1974 and are designed to control the amount of pollutants added to an area by any new (constructed after July 1975) major source of air pollution. These standards govern pollutant emissions as they leave the stack or chimney of the facility. They are tied to the amount of heat (in British thermal units [Btu]) generated when the fuel (from which the pollutants result) is burned in the facility. New Source Performance Standards govern a large number of emissions; however, for power generating facilities, the regulated pollutants are sulfur dioxide, particulates, and nitrogen dioxide. These are limited as follows:

TABLE 11

KENTUCKY AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Interval	Primary Standard (µg/m^3)	Secondary Standard (µg/m^3)
Sulfur Dioxide	3-Hour	-	1,300
	24-Hour	365	-
	Annual	80	
Total Suspended Particulates	Annual Geometric Mean[a]	75	60
	24-Hour[a]	260	150
Settleable Particulates[b]	3-Month	-	15[c]
Carbon Monoxide	1-Hour	40,000	40,000
	8-Hour	10,000	10,000
Nitrogen Oxides	Annual	100	100
Hydrogen Sulfide[b]	1-Hour	-	14
Photochemical Oxidants	1-Hour	160	160
Nonmethane Hydrocarbons	3-Hour (6-9 a.m.)	160	160

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[a] Not to be exceeded more than once per year.

[b] Kentucky standard only.

[c] Tons per square mile per month.

Source: Commonwealth of Kentucky, 1974c

New Source Performance Standards for Coal-Fired Steam Electric Generating Facilities

Pollutant	Emission Limitation
Sulfur dioxide	1.2 lb/million Btu's
Particulates	0.1 lb/million Btu's
Nitrogen dioxide	0.7 lb/million Btu's

Federal regulations for Prevention of Significant Deterioration of Air Quality establish what additional amount (increment) of sulfur dioxide and particulate concentrations, measured at ground level, all New Sources combined can add to those concentrations already present in any given location. (The implications of this regulation are discussed under "Land Use" in the Impact Summary table.) Under these regulations, all areas of the United States have been divided into one of two categories:

1. Class I - areas where existing air quality is excellent (pristine areas)
2. Class II - areas of moderate pollution where additions of well-controlled emissions would not significantly degrade existing area quality

Most areas of the United States are presently listed as Class II areas, including the proposed plant site. The following are the allowable increments of sulfur dioxide and particulates that may be added to existing pollutant concentrations in a Class II area by a major new source of air pollutants:

Allowable Increments of Significant Deterioration of Air Quality (Class II)[a]

Emission	Allowable Increment ($\mu g/m^3$)
Sulfur dioxide	
3-Hour Maximum	512
24-Hour Maximum	91
Annual Arithmetic Mean	20
Particulates	
24-Hour Maximum	37
Annual Geometric Mean	19

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[a] Clean Air Act Amendments, August 1977.

In determining whether the emissions of the proposed facility would meet Ambient Air Quality Standards and regulations for Prevention of Significant Deterioration, four steps were performed:

1. The existing air quality of the site was measured by an onsite monitoring program
2. The emission rates of sulfur dioxide, particulates, and nitrogen dioxide that the plant will release to the atmosphere were calculated
3. A computer modeling study was conducted to determine (1) what the maximum ground level concentrations of these pollutants would be; and (2) the area where they would occur
4. These concentrations were compared to the onsite monitoring data to determine if they were within the Ambient Air Quality Standards; they were then compared to the allowable increases in pollutant concentrations as defined by the regulations for Prevention of Significant Deterioration

Tables 12 and 13 present the results of these steps. The air quality investigation indicated that emissions from the Trimble County plant will not cause any violations of Ambient Air Quality Standards or New Source Performance Standards, and will be within the available increment specified by Prevention of Significant Deterioration regulations. This conclusion is based on a design emission rate of 0.78 pound of sulfur dioxide per million Btu's of heat output (compared to the 1.2-pound limit specified by New Source Performance Standards). The Applicant will be required to demonstrate, by in-stack monitoring, that this emission rate, or lower, will be maintained throughout the operating life of the plant. Sections 6.3 and 6.4 of the supporting report present a full discussion of these steps and include figures that depict the geographical distribution of the maximum concentrations of sulfur dioxide, particulates, and nitrogen dioxide projected to result from the operation of the proposed plant.

The proposed Trimble County Generating Plant site is located approximately 12 miles downriver from the Clifty Creek Generating Plant in Madison, Indiana. Because emissions from this plant have caused violations of Ambient Air Quality Standards, a study was run to determine what, if any, additional effect the operation of the Trimble County plant would have on pollution concentrations in the Madison area and, conversely, what additional pollution concentrations would result in the Wises Landing area if the Clifty Creek plant emissions interacted with the Trimble County plant emissions. Details of this study are presented in Section 6.3.1 of the supporting report. The study results showed the following:

1. If the chimney plumes from the proposed Trimble County Generating Plant interacted with the chimney plumes of the Clifty Creek plant, the maximum combined 3-hour average concentration of sulfur dioxide in the Madison area would be 2,898 $\mu g/m^3$, which constitutes a violation of the Ambient Air Quality Secondary Standard of 1,300 $\mu g/m^3$.

TABLE 12

MAXIMUM GROUND-LEVEL POLLUTANT CONCENTRATION ($\mu g/m^3$) RESULTING FROM OPERATION OF THE TRIMBLE COUNTY GENERATING PLANT AS A FUNCTION OF THE NUMBER OF UNITS IN OPERATION

	SO_2			Particulates	
	Annual Avg.	Max. 3-Hr.	Max. 24-Hr.	Annual Avg.	Max. 24-Hr.
UNIT 1					
86% efficiency scrubber no reheat	2.4	295	47	0.2	3.1
UNITS 1 and 2					
double liner stack 86% efficiency scrubber no reheat	2.7	391	74	0.2	4.9
UNITS 1, 2 and 3					
1 double, 1 single liner stack 90% efficiency scrubber 25°F reheat	3.5	465	80	0.2	5.3
UNITS 1, 2, 3 and 4					
2 double liner stacks 90% efficiency scrubber 25°F reheat	3.9	471	79	0.3	5.2

TABLE 13

COMPARISON OF THE PROPOSED TRIMBLE COUNTY GENERATING PLANT AMBIENT LEVELS[a] TO THE FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Interval	Primary Standard ($\mu g/m^3$)	Secondary Standard ($\mu g/m^3$)	Baseline Level[b] ($\mu g/m^3$)	Maximum[c] Calculated	Total Ambient Levels
Sulfur Dioxide	3-hour	-	1,300	331	471	802
	24-hour	365	-	113	80	193
	Annual	80	-	40	4	44
Total Suspended Particulates	24-hour	260	150	123	5	128
	Annual	75	60	57	>1	>58
Nitrogen Dioxide	Annual	100	100	80	4	84

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[a] Combination of estimated maximum concentration resulting from operation of the proposed plant and maximum ambient background concentration.

[b] Baseline values are the maximum measured values from Louisville Gas and Electric Company's 1975 monitoring program.

[c] Maximum calculated values are those calculated by the EPA Single Source CRSTER model.

The study showed, however, that this violation would have occurred even if the Trimble County plant were not in operation, as the concentration contributed by this plant was only 0.1 $\mu g/m^3$.

2. The maximum 24-hour concentration resulting from the combined emission of the two plants was projected to be 495 $\mu g/m^3$ in the Madison area. This concentration exceeds the 24-hour primary ambient air quality standard for SO_2. However, the amount of SO_2 contributed to this violation by the Trimble County plant was only 0.0009 $\mu g/m^3$.

3. Under no conditions would the Clifty Creek plant, when interacting with the Trimble County plant, cause a violation of any Ambient Air Quality Standards in the Wises Landing area

The impacts of the pollutants that will be released to the atmosphere by the proposed plant are discussed in the following section.

SUMMARY OF IMPACTS OF PLANT CONSTRUCTION AND OPERATION

To provide an easily readable summary of the projected environmental impacts of the proposed project, a summary table (Table 14) was developed. This table lists the environmental components (for example, vegetation) that will be subject to impacts from the construction and operation of the plant (Column I); the sources of impact (for example, site clearing activities) (Column II); the projected impacts (Column III); the duration and degree of impact (Column IV); and the studies and/or measures that will be undertaken to identify and/or reduce these impacts (Column V). Only those impacts that are considered to be, or have the potential to be, significant are discussed in this document. All other impacts are discussed in detail in the supporting report.

TABLE 14

SUMMARY OF IMPACTS PROJECTED TO RESULT FROM CONSTRUCTION AND OPERATION OF THE PROPOSED TRIMBLE COUNTY GENERATING PLANT

I *ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT*	II *SOURCE OF IMPACTS*	III *PROJECTED IMPACTS OR EFFECTS*	IV *DURATION AND DEGREE OF IMPACT*	V *MEASURES TO MITIGATE PROJECTED IMPACTS*
AIR QUALITY	CONSTRUCTION ACTIVITIES (CLEARING, GRADING, TRAFFIC, EQUIPMENT MOVEMENT, ETC.)	INCREASE IN AIRBORNE DUST	THROUGHOUT 14-YEAR CONSTRUCTION PHASE.	
			VARIES FROM LOW TO HIGH IMPACT, DEPENDING ON NATURE AND EXTENT OF CONSTRUCTION ACTIVITIES AND WEATHER CONDITIONS	USE OF DUST SUPRESSION MEASURES, PARTICULARLY WETTING OF ROAD SURFACES
	CONSTRUCTION EQUIPMENT AND CONSTRUCTION WORKERS' VEHICLES	INCREASED LEVELS OF NITROGEN OXIDES, CARBON MONOXIDE, AND HYDROCARBONS FROM ENGINE EXHAUST	THROUGHOUT 14-YEAR CONSTRUCTION PHASE.	
			LOW TO MODERATE IMPACT	
	SULFUR DIOXIDE, PARTICULATES (ASH), AND NITROGEN DIOXIDE IN FLUE GAS (CHIMNEY) EMISSIONS	RELEASE OF LARGE AMOUNTS OF THESE POLLUTANTS TO THE ATMOSPHERE. MAXIMUM GROUND LEVEL POLLUTANT CONCENTRATIONS RESULTING FROM OPERATION OF THE PROPOSED PLANT ARE PROJECTED TO OCCUR WITHIN APPROXIMATELY 1.4 KM OF THE PLANT SITE	THROUGHOUT 36-YEAR TOTAL OPERATING LIFE OF PLANT.	
			MAJOR IMPACT; HOWEVER, GROUND LEVEL CONCENTRATIONS WILL REMAIN BELOW FEDERAL AND STATE STANDARDS FOR FOSSIL FUEL EMISSIONS	RELEASE OF POLLUTANTS AT SUFFICIENT HEIGHT TO ALLOW RAPID DISPERSION AND DIFFUSION
				USE OF POLLUTION CONTROL EQUIPMENT (SCRUBBERS, PRECIPITATORS, AND BOILERS DESIGNED TO CONTROL NITROGEN OXIDES). THIS EQUIPMENT WILL REMOVE 90 PERCENT OF THE SULFUR DIOXIDE, 99 PERCENT OF THE PARTICULATES, AND LIMIT THE FORMATION OF NITROGEN DIOXIDE.
				FLUE GAS EMISSIONS WILL BE MONITORED TO ENSURE THAT THEY REMAIN WITHIN THE NEW SOURCE PERFORMANCE STANDARD LIMITS.
				DURING PERIODS WHEN THE SCRUBBERS CANNOT BE OPERATED, THE APPLICANT WILL REDUCE THE OPERATING MODE OF THE AFFECTED UNIT OR BURN LOW SULFUR COAL IN ITS STEAM GENERATORS (A 30-DAY SUPPLY OF LOW SULFUR COAL WILL BE STORED ON THE SITE)

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
AIR QUALITY (CONT'D)	SULFATE FORMATION	INCREASED ACIDITY OF RAINFALL NEAR THE PLANT	THROUGHOUT 36-YEAR TOTAL OPERATING LIFE OF PLANT. NO SIGNIFICANT IMPACT EXPECTED, AS NECESSARY INGREDIENT (SULFUR DIOXIDE) WILL BE CONTROLLED. HOWEVER, NEITHER THIS PHENOMENON NOR THE FORMATION OF SUSPENDED SULFATES CAN BE ADEQUATELY ESTIMATED WITH AVAILABLE TECHNOLOGY	
	COOLING TOWER OPERATION	VISIBLE VAPOR PLUME	THROUGHOUT 36-YEAR TOTAL OPERATING LIFE OF PLANT. LOW TO MODERATE IMPACT. PLUME WILL RARELY EXTEND MORE THAN 3.1 MILES FROM PLANT; MOST VISIBLE IN WINTER	
		GROUND LEVEL FOGGING	THROUGHOUT 36-YEAR TOTAL OPERATING LIFE OF PLANT. FOGGING WILL OCCUR ABOUT 19 HOURS PER YEAR WITHIN 0.8 MILE OF PLANT. BEYOND 3 MILES, FREQUENCY OF FOGGING WILL BE LESS THAN 1 HOUR PER YEAR. INCIDENCES OF FOGGING TO SOUTH AND SOUTHWEST MAY PRESENT A HAZARD TO RIVER TRAFFIC BY REDUCING VISIBILITY AT TIMES WHEN NATURAL FOG WOULD NOT BE EXPECTED	
		DRIFT DEPOSITION (WATER DROPLETS CONTAINING IMPURITIES FROM RIVER WATER AND CHEMICALS ADDED TO PREVENT BIOLOGICAL GROWTH IN PIPES AND COOLING TOWERS)	HIGHEST DEPOSITION RATES WILL OCCUR TO THE NORTH, CLOSE TO THE PLANT. THE KENTUCKY STANDARD FOR DRIFT DEPOSITION IS 15 TONS PER SQUARE MILE PER MONTH. THE MAXIMUM PROJECTED RATE FOR THE PLANT IS 0.12 TONS PER SQUARE MILE PER MONTH	

TABLE 14 (Continued)

I *ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT*	II *SOURCE OF IMPACTS*	III *PROJECTED IMPACTS OR EFFECTS*	IV *DURATION AND DEGREE OF IMPACT*	V *MEASURES TO MITIGATE PROJECTED IMPACTS*
GEOLOGY AND TOPOGRAPHY	GRADING OPERATIONS	MECHANICAL STRENGTHENING AND MATERIAL ARRANGEMENT OF SITE'S RECENT ALLUVIAL DEPOSITS	THROUGHOUT 14-YEAR CONSTRUCTION PHASE SIGNIFICANT IMPROVEMENT OF THE SUPPORT, CONTAINMENT, AND DRAINAGE FEATURES OF THE SITE	
	SOLID WASTE DISPOSAL IN RAVINES RA AND RB	UNDER MAXIMUM WORST-CASE COAL CONDITIONS, RAVINES WILL BE COMPLETELY FILLED SO THAT THE TOP OF THE FILL WILL BE AT THE SAME HEIGHT (AROUND 800 FEET ABOVE MEAN SEA LEVEL) AS THE PRESENT RIDGE TOPS	MAJOR IMPACT, AS A DRAMATIC CHANGE IN TOPOGRAPHY WILL OCCUR	
SURFICIAL SOILS	GRADING OPERATIONS	DESTRUCTION OF APPROXIMATELY 421 ACRES OF CROPLAND SOILS	PERMANENT, MAJOR IMPACT DUE TO THE HIGH PRODUCTIVITY OF THIS SOIL	STOCKPILING OF TOPSOIL FOR USE IN REVEGETATION OF OPEN AREAS
VEGETATION	SITE CLEARING OPERATIONS AND FILLING OF RAVINES WITH SOLID WASTE FROM PLANT OPERATIONS	ELIMINATION OF 1,844 ACRES OF VEGETATION, INCLUDING APPROXIMATELY 400 ACRES OF CROPLAND VEGETATION AND 14 ACRES OF VALUABLE BOTTOMLAND WOODS VEGETATION, FROM PLANT SITE	PERMANENT, MAJOR IMPACT LOSS OF CROPLAND VEGETATION AMOUNTS TO AN ECONOMIC LOSS OF $3,892,000 (BASED ON 36 YEARS OF PLANT OPERATION) EROSION, SEDIMENTATION, AND ORGANIC AND INORGANIC NUTRIENT LOSS FROM PLANT SOILS AS A RESULT OF VEGETATION REMOVAL DISRUPTION OF SUCCESSIONAL TRENDS IN IMMEDIATE PLANT AREA	LOSS OF RAVINE VEGETATION WILL BE VERY GRADUAL OVER THE OPERATING LIFE OF THE PLANT. TREES WILL BE CUT AS REQUIRED, BUT GROUND COVER WILL NOT BE REMOVED. TREES WILL NOT BE REMOVED FROM THE RIDGETOPS OR AREAS IN THE RAVINES NOT REQUIRED FOR WASTE DISPOSAL
	KENTUCKY TRANSMISSION LINE CONSTRUCTION AND OPERATION	DISRUPTION OF 34.5 ACRES OF VEGETATION (18.4 ACRES OF WOODLAND)	LOW, TEMPORARY IMPACT TO NONWOODLAND VEGETATION MAJOR IMPACT TO WOODLAND VEGETATION IN TERMS OF TIME (THAT IS, TIME REQUIRED FOR WOODLAND VEGETATION TO MATURE)	LIMITED USE OF HERBICIDES

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
VEGETATION (CONT'D)	KENTUCKY TRANSMISSION LINE CONSTRUCTION AND OPERATION (CONT'D)		MODERATE IMPACT IN TERMS OF LOSS OF COMMERCIAL VALUE OF TIMBER	
	INDIANA TRANSMISSION LINE CONSTRUCTION AND OPERATION	DISRUPTION OF 328.1 ACRES OF VEGETATION (76.3 ACRES OF WOODLAND)	LOW, TEMPORARY IMPACT TO NONWOODLAND VEGETATION	
			MAJOR IMPACT TO WOODLAND VEGETATION IN TERMS OF TIME AND AS REMOVAL OF THIS VEGETATION WILL CONTRIBUTE TO ONGOING LONG-TERM DESTRUCTION OF WOODLAND VEGETATION IN INDIANA	ASSESSMENT OF VEGETATION OF FINAL CORRIDOR WILL BE CONDUCTED TO IDENTIFY MOST SENSITIVE AREAS ALONG ROUTE SO THAT THESE CAN BE PROTECTED
	PLANT ATMOSPHERIC EMISSIONS, INCLUDING DRIFT (SEE AIR QUALITY)	POTENTIAL FOR CROP AND OTHER VEGETATION DAMAGE	LOW POTENTIAL IMPACT	LIMITED USE OF HERBICIDES
			CHRONIC INJURY TO MOST PLANTS FROM SULFUR DIOXIDE CAN BE EXPECTED DURING LONG-TERM AVERAGE ANNUAL DOSAGES OF 60 MICROGRAMS PER CUBIC METER. PRESENT MAXIMUM SULFUR DIOXIDE CONCENTRATION IN THE PROPOSED SITE AREA IS 40 MICROGRAMS PER CUBIC METER. MAXIMUM ANNUAL AVERAGE CONCENTRATION TO BE CONTRIBUTED BY THE PLANT WILL BE 3 MICROGRAMS PER CUBIC METER	
WILDLIFE	SITE CLEARING OPERATIONS AND FILLING OF THE RAVINES WITH SOLID WASTE FROM PLANT OPERATIONS	LOSS OF 1,844 ACRES OF WILDLIFE FORAGE, COVER, LIVING, BREEDING, AND NESTING AREA, INCLUDING 14 ACRES OF BOTTOMLAND WOODS; REDUCTION AND POSSIBLE ELIMINATION OF A WELL-ESTABLISHED STOPOVER POINT FOR MIGRATING WATERFOWL	PERMANENT, MAJOR IMPACT	
			THE SITE, PARTICULARLY THE BOTTOMLAND WOODS ALONG CORN CREEK AND THE OXBOW AND THE ADJACENT AGRICULTURAL FIELDS, SUPPORTS AN ABUNDANT WILDLIFE POPULATION AND PROVIDES AN ESTABLISHED STOPOVER POINT FOR MIGRATING WATERFOWL	THE MAJOR PORTION OF THE OXBOW AREA WILL REMAIN AS IS. BECAUSE THE RAVINES WILL BE FILLED GRADUALLY, ONE AT A TIME, LOSS OF THE WILDLIFE HABITAT IN THESE AREAS WILL BE GRADUAL
		DESTRUCTION OF SOME NON-MOBILE SPECIES OF WILDLIFE (SMALL RODENTS, AMPHIBIANS, AND REPTILES)		

TABLE 14 (Continued)

I *ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT*	II *SOURCE OF IMPACTS*	III *PROJECTED IMPACTS OR EFFECTS*	IV *DURATION AND DEGREE OF IMPACT*	V *MEASURES TO MITIGATE PROJECTED IMPACTS*
WILDLIFE (CONT'D)	SITE CLEARING OPERATIONS AND FILLING OF THE RAVINES WITH SOLID WASTE FROM PLANT OPERATIONS (CONT'D)	REDUCTION OF POPULATION NUMBERS OF SPECIES ON AND IMMEDIATELY ADJACENT TO SITE IF CONSTRUCTION ACTIVITIES COINCIDE WITH BREEDING AND NESTING SEASON		
		FORCED EMIGRATION OF MOBILE WILDLIFE FROM SITE INTO ADJACENT AREAS	ANIMALS WILL BE FORCED TO MOVE INTO AREAS THAT ARE PROBABLY ALREADY SUPPORTING THE MAXIMUM NUMBER OF SPECIES CAPABLE OF LIVING IN THESE AREAS. AS A RESULT, THEY WILL BE FORCED INTO COMPETITION FOR SPACE, FOOD, AND OTHER LIFE REQUIREMENTS. THE RESULT WILL BE A DIRECT OR INDIRECT REDUCTION IN THE NUMBER OF ANIMALS PRESENTLY IN THE SITE AREA	
	HIGHER TRAFFIC LEVELS ON U.S. 421, SR 754, AND CR 1488	INCREASED NUMBER OF ROAD-KILLS	THROUGHOUT CONSTRUCTION AND OPERATING PHASES	
	INCREASED NOISE, DUST, AND HUMAN DISTURBANCE	MAY CAUSE A DISRUPTION OF PREDATOR-PREY RELATIONSHIPS, MATING BEHAVIOR, AND REPRODUCTION	THROUGHOUT CONSTRUCTION PHASE; SHOULD NOT BE AS SIGNIFICANT DURING PLANT OPERATION	
	TRANSMISSION LINE ROUTE CLEARING	IN WOODLAND AREAS, CREATION OF "EDGE" HABITAT THAT WILL SUPPLY FOOD AND COVER TO ANIMALS RESIDING IN ADJACENT AREAS	THROUGHOUT LIFE OF TRANSMISSION LINES	
GROUND WATER QUALITY	SOLID WASTE DISPOSAL IN RAVINES	POTENTIAL GROUND WATER CONTAMINATION FROM LEACHATE	THROUGHOUT DISPOSAL PERIOD AND FOR SOME TIME AFTER DISPOSAL OPERATIONS ARE CONCLUDED	

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
GROUND WATER QUALITY (CONT'D)	SOLID WASTE DISPOSAL IN RAVINES (CONT'D)		NO IMPACT ANTICIPATED AS RESULT OF MITIGATING MEASURES TO BE EMPLOYED	THE APPLICANT IS CURRENTLY CONDUCTING A STUDY, IN CONJUNCTION WITH THE EPA, OF THE CHEMICAL FIXATION PROCESS PROPOSED TO TRANSFORM THE SCRUBBER SLUDGE/FLY ASH MIXTURE TO BE PLACED IN THE RAVINES INTO A STABLE, NONLEACHABLE LANDFILL-TYPE OF MATERIAL. THE APPLICANT IS REQUIRED TO DEMONSTRATE TO THE EPA, 1 YEAR PRIOR TO THE START UP OF UNIT 1, THAT THIS PROCESS WILL ACCOMPLISH THE SATISFACTORY STABILIZATION OF THE WASTE MATERIAL. IF THIS PROCESS HAS NOT BEEN DEVELOPED BY THIS TIME, OR IF THE PROCESS CANNOT BE DEMONSTRATED TO HAVE LONG-TERM RELIABILITY, THE APPLICANT WILL BE REQUIRED TO SELECT A SUITABLE OFFSITE DISPOSAL AREA, FOR WHICH A COMPLETE ENVIRONMENTAL IMPACT ANALYSIS WILL HAVE TO BE PREPARED AND SUBMITTED TO THE EPA AND THE COMMONWEALTH OF KENTUCKY IF THE RAVINES ARE USED TO STORE THE STABILIZED MATERIAL AND A LEACHATE POTENTIAL IS BELIEVED TO EXIST, GROUND WATER MONITORING OF THE RAVINES MAY BE REQUIRED
	BOTTOM ASH AND EMERGENCY SCRUBBER SLUDGE/FLY ASH DISPOSAL POND AND COAL STORAGE AREAS	POTENTIAL GROUND WATER CONTAMINATION FROM LEACHATE	THROUGHOUT 36-YEAR TOTAL PLANT OPERATING LIFE	THE APPLICANT WILL LINE THE BOTTOM ASH AND EMERGENCY SCRUBBER SLUDGE/FLY ASH DISPOSAL POND WITH A LINER TO IMPEDE THE DISCHARGE OF LEACHATE FURTHER, THE APPLICANT WILL IMPLEMENT AND MAINTAIN A GROUND WATER MONITORING PROGRAM. DETAILS OF THE PROGRAM AS WELL AS QUARTERLY REPORTS WILL BE SUBMITTED TO THE EPA AND THE COMMONWEALTH OF KENTUCKY. IF THE REPORTS DEMONSTRATE THAT SIGNIFICANT CONTAMINATION (LEVELS IN EXCESS OF

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
GROUND WATER QUALITY (CONT'D)	BOTTOM ASH AND EMERGENCY SCRUBBER SLUDGE/FLY ASH DISPOSAL POND AND COAL STORAGE AREAS (CONT'D)			DRINKING WATER STANDARDS) IS PRESENT, THE APPLICANT WILL BE REQUIRED TO IMPLEMENT MEASURES TO MITIGATE SUCH CONTAMINATION AND TO ASSURE THAT NO FUTURE CONTAMINATION WILL OCCUR
SURFACE WATER QUALITY	RUNOFF FROM SITE AREAS SUBJECT TO CLEARING, GRADING, AND OTHER CONSTRUCTION ACTIVITIES AND TRANSMISSION LINE CONSTRUCTION	INCREASED LEVELS OF TURBIDITY, SEDIMENTATION, AND SUSPENDED SOLIDS IN CORN CREEK, THE OHIO RIVER, AND STREAMS CROSSED BY THE TRANSMISSION LINES; POTENTIAL DEGRADATION OF THE OXBOW AREA	PRIMARILY DURING FIRST 2 YEARS OF CONSTRUCTION PHASE FOR PLANT SITE; DURING TRANSMISSION LINE CONSTRUCTION, SHORT-TERM IMPACT ON OXBOW AREA LOW TO MODERATE POTENTIAL IMPACT (NOTE: BACKGROUND LEVELS OF TURBIDITY AND SUSPENDED SOLIDS ARE FREQUENTLY HIGH IN OHIO RIVER. WATER QUALITY OF OXBOW AREA IS POOR)	RUNOFF FROM POWER PLANT, COOLING TOWER, AND LAYDOWN AREAS WILL BE COLLECTED, STORED, AND TREATED BEFORE RELEASE TO THE OHIO RIVER. OTHER APPROPRIATE EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE IMPLEMENTED PRIOR TO AND DURING ALL CONSTRUCTION ACTIVITIES
	CONSTRUCTION OF DOCKING AND UNLOADING FACILITIES AND INTAKE AND DISCHARGE STRUCTURES	INCREASED LEVELS OF TURBIDITY, SEDIMENTATION, AND SUSPENDED SOLIDS, AND RESUSPENSION OF CONTAMINATED RIVER BOTTOM SEDIMENTS, IN NEARSHORE OHIO RIVER WATERS ADJACENT TO AND IMMEDIATELY DOWNSTREAM OF CONSTRUCTION AREAS	DURING CONSTRUCTION OF THESE FACILITIES LOW TO HIGH IMPACT, DEPENDING ON BACKGROUND LEVELS IN THE OHIO RIVER AT THE TIME	
	RELOCATION OF PREVIOUSLY ALTERED, LOWER 1,800 FEET OF CORN CREEK	INCREASE IN TURBIDITY AND SUSPENDED SOLIDS IN CORN CREEK AND OHIO RIVER NEAR NEW MOUTH OF CREEK	IMMEDIATELY FOLLOWING CONSTRUCTION OF THE NEW CHANNEL MODERATE, SHORT-TERM IMPACT	NEW CHANNEL WILL BE CONSTRUCTED DRY, RIPRAPPED, AND THEN OPENED TO RECEIVE CORN CREEK WATERS
	INCREASED BARGE TRAFFIC	INCREASED WAVE ACTION (RESULTING IN SHORELINE EROSION) AND TURBIDITY LEVELS IN OHIO RIVER; RESUSPENSION OF CONTAMINATED RIVER BOTTOM SEDIMENTS	THROUGHOUT BOTH CONSTRUCTION AND OPERATING PHASES	

TABLE 14 (Continued)

I *ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT*	II *SOURCE OF IMPACTS*	III *PROJECTED IMPACTS OR EFFECTS*	IV *DURATION AND DEGREE OF IMPACT*	V *MEASURES TO MITIGATE PROJECTED IMPACTS*
SURFACE WATER QUALITY	INCREASED BARGE TRAFFIC (CONT'D)		LOW TO MODERATE IMPACT, AS THESE CONDITIONS ALREADY EXIST IN AREA AS A RESULT OF EXISTING BARGE TRAFFIC, SAND DREDGING OPERATIONS, AND BACKGROUND CONDITIONS; FURTHER, TOTAL BARGE TRAFFIC INCREASE IS LOW	
	POTENTIAL SPILLS OF COAL, FUEL, OIL, CEMENT, SAND, GRAVEL, LIMESTONE, CAUSTIC SODA, ALUM, AND SULFURIC ACID DURING UNLOADING OPERATIONS	DEGRADATION OF WATER QUALITY	THROUGHOUT BOTH CONSTRUCTION AND OPERATING PHASES	
			LOW TO MAJOR POTENTIAL IMPACT DEPENDING ON AMOUNT OF SPILL; HOWEVER, ONLY SMALL SPILLS ARE ANTICIPATED	APPLICANT ASSUMES RESPONSIBILITY FOR CLEAN-UP OF ALL SPILLS TO THE OHIO RIVER FROM BARGE UNLOADING OR LOADING OPERATIONS OF OIL, COAL, REACTANT, OR OTHER CHEMICALS. FEDERAL OIL POLLUTION PREVENTION PROCEDURES (40 CFR PART 112) WILL BE FOLLOWED
AQUATIC LIFE	IMPINGEMENT/ENTRAINMENT OF AQUATIC ORGANISMS BY THE INTAKE STRUCTURE	POTENTIAL LOSS OF SOME AQUATIC ORGANISMS, PARTICULARLY EGGS, LARVAL FISHES, AND OTHER FLOATING ORGANISMS	THROUGHOUT 36-YEAR TOTAL PLANT OPERATING LIFE	THE APPLICANT WILL CONDUCT STUDIES TO DETERMINE WHAT, IF ANY, IMPACT OPERATION OF THE INTAKE STRUCTURE HAS ON THE AQUATIC ENVIRONMENT. THESE STUDIES WILL BE CONDUCTED FOR EACH GENERATING UNIT DURING ITS FIRST YEAR OF OPERATION. RESULTS OF THE STUDIES WILL BE SUBMITTED TO THE EPA. IF THE STUDIES SHOW THAT SIGNIFICANT IMPACT IS OCCURRING, MEASURES WILL BE INSTITUTED TO MITIGATE SUCH IMPACT AND ASSURE THAT NO FURTHER IMPACT OCCURS
	POTENTIAL DEGRADATION OF OHIO RIVER WATER QUALITY FROM LARGE ACCIDENTAL SPILL OF MATERIAL DURING BARGE UNLOADING OPERATIONS, PARTICULARLY OF OIL OR SULFURIC ACID	MOVEMENT OF ADULT FISH FROM THE AREA; DESTRUCTION OF FIXED MACROBENTHIC, PERIPHYTON, AND MOLLUSK POPULATIONS; REDUCTION OF PLANKTON POPULATIONS; A GENERAL REDUCTION IN THE STABILITY AND COMMUNITY STRUCTURE OF THE AQUATIC ECOSYSTEM	THROUGHOUT BOTH CONSTRUCTION AND OPERATING PHASES MAJOR, RELATIVELY SHORT-TERM IMPACT TO ALL SPECIES' POPULATIONS EXCEPT MOLLUSKS	

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
AQUATIC LIFE (CONT'D)	POTENTIAL LARGE INCREASES IN TURBIDITY, SEDIMENTATION, SUSPENDED SOLIDS, AND RESUSPENSION OF CONTAMINATED RIVER BOTTOM SEDIMENTS FROM CONSTRUCTION ACTIVITIES, BARGE TRAFFIC, AND REROUTING OF CORN CREEK (SEE "WATER QUALITY")	HIGH TURBIDITY AND SUSPENDED SOLIDS LEVELS MAY INTERFERE WITH GILL "BREATHING" OF SOME SPECIES AND WITH SENSORY RECEPTORS TO LOCATE PREY. LESS MOBILE SPECIES MAY DIE	THROUGHOUT BOTH CONSTRUCTION AND OPERATING PHASES LOW TO MODERATE IMPACT, DEPENDING ON EXISTING CONDITIONS IN OHIO RIVER (NOTE: SEE "WATER QUALITY." SPECIES PRESENT IN OHIO RIVER ARE PRIMARILY POLLUTION-TOLERANT ORGANISMS. FURTHER, THEIR NUMBERS AND DIVERSITY ARE RELATIVELY LOW. THUS, LARGE POPULATIONS WOULD NOT BE SUBJECT TO THESE ADVERSE IMPACTS)	
		EGGS SPAWNED IN AREA COULD BE SILTED OVER		
		ADDITIONAL SUSPENDED SOLIDS AND RESUSPENDED SEDIMENTS CAN AFFECT PHYTOPLANKTON, PERIPHYTON, AND SHALLOW-WATER AQUATIC PLANTS BY CLOUDING THE WATER TO SUCH A DEGREE THAT THE AMOUNT OF SUNLIGHT REACHING THESE ORGANISMS IS SUBSTANTIALLY REDUCED. WHEN THIS OCCURS, PHOTOSYNTHESIS IS REDUCED OR PREVENTED AND MANY OF THE LIGHT-DEPENDENT ORGANISMS DIE		
		INCREASED DISSOLVED NUTRIENT LEVELS FROM RESUSPENSION OF BOTTOM SEDIMENTS AND FROM EROSION		
	RELOCATION OF LOWER CORN CREEK	PRODUCTIVITY OF LOWER CORN CREEK WILL BE COMPLETELY ELIMINATED. SPECIES PARTICULARLY AFFECTED WILL BE THOSE THAT USE THE CREEK FOR SPAWNING	A LONG-TERM (POSSIBLY 10 TO 15 YEARS), MAJOR IMPACT. HOWEVER, THE PRODUCTIVITY OF THE CREEK SHOULD EVENTUALLY RETURN TO LEVELS SIMILAR TO THOSE OF THE PRESENT CHANNEL, WHICH WAS ORIGINALLY RELOCATED SOMETIME DURING THE 1940'S	
		REDUCED FOOD AND COVER AVAILABLE FOR DEVELOPING YOUNG-OF-THE-YEAR FISHES		

TABLE 14 (Continued)

I *ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT*	II *SOURCE OF IMPACTS*	III *PROJECTED IMPACTS OR EFFECTS*	IV *DURATION AND DEGREE OF IMPACT*	V *MEASURES TO MITIGATE PROJECTED IMPACTS*
AQUATIC LIFE (CONT'D)	PLACEMENT OF BARGE FACILITIES FACILITIES AND INTAKE AND DISCHARGE STRUCTURES	ELIMINATION OF SOME PRESENT AQUATIC HABITAT NEW SUBSTRATE PROVIDED FOR PERIPHYTON, INSECTS, AND MOLLUSKS		
POPULATION	PEAK PLANT CONSTRUCTION WORK FORCE (695 PERSONS)	MAXIMUM OF 35 CONSTRUCTION WORKERS EXPECTED TO RELOCATE TO TRIMBLE COUNTY; INCLUDING DEPENDENTS, A MAXIMUM OF 125 PERSONS EXPECTED TO RELOCATE AS A RESULT OF PLANT CONSTRUCTION	DURATION OF 14-YEAR PLANT CONSTRUCTION PHASE MODERATE IMPACT. RELOCATIONS WILL OCCUR GRADUALLY, WITH MAXIMUM NUMBER REACHED IN 1983	
	PEAK PLANT OPERATING WORK FORCE (350 PERSONS)	MAXIMUM OF 190 WORKERS EXPECTED TO RELOCATE TO TRIMBLE COUNTY; INCLUDING DEPENDENTS, A MAXIMUM OF 678 PERSONS EXPECTED TO RELOCATE AS A RESULT OF PLANT OPERATION. POPULATION OF BEDFORD MAY DOUBLE	DURATION OF 36-YEAR TOTAL PLANT OPERATING LIFE MAJOR IMPACT. MAXIMUM EXPECTED RELOCATIONS CONSTITUTE 5.6 PERCENT OF COUNTY'S PRESENT POPULATION AND WILL CAUSE AN 11 PERCENT INCREASE OVER CURRENT POPULATION PROJECTIONS FOR 1989 (YEAR MAXIMUM NUMBER OF RELOCATIONS WILL BE REACHED). HOWEVER, INCREASE WILL OCCUR OVER A 6-YEAR PERIOD, ALLOWING PLANNING BY COUNTY OFFICIALS	
EMPLOYMENT	PLANT CONSTRUCTION EMPLOYMENT REQUIREMENTS	A MAXIMUM OF 695 NEW JOBS	THROUGHOUT 14-YEAR PLANT CONSTRUCTION PHASE MAJOR IMPACT, PRIMARILY ON LOUISVILLE CONSTRUCTION LABOR POOL	
	INDUCED SERVICES-RELATED EMPLOYMENT REQUIREMENTS	CREATION OF APPROXIMATELY 904 NEW JOBS AS A RESULT OF CONSTRUCTION WORK DEMANDS FOR GOODS AND SERVICES	LOW IMPACT TO LOUISVILLE AREA	

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
EMPLOYMENT (CONT'D)	PLANT OPERATION EMPLOYMENT REQUIREMENTS	A MAXIMUM OF 350 JOBS	THROUGHOUT 36-YEAR TOTAL PLANT OPERATING LIFE MODERATE IMPACT (DEPENDING ON LOCATION OF WORKER SPENDING)	
	INDUCED SERVICES-RELATED EMPLOYMENT REQUIREMENTS	CREATION OF APPROXIMATELY 455 NEW JOBS IN 5-COUNTY AREA (TRIMBLE, CARROLL, OLDHAM, AND JEFFERSON COUNTIES IN KENTUCKY, AND JEFFERSON COUNTY IN INDIANA)	MODERATE IMPACT	
ECONOMY	PLANT CONSTRUCTION EMPLOYMENT WAGES	OVER $152 MILLION IN WAGES WILL BE PAID TO CONSTRUCTION PERSONNEL. OF THIS, $107 MILLION WILL CONSTITUTE DISPOSABLE INCOME	THROUGHOUT 14-YEAR PLANT CONSTRUCTION PHASE MAJOR IMPACT TO ECONOMY OF AREAS (PRIMARILY LOUISVILLE METROPOLITAN AREA) IN WHICH WAGES ARE SPENT	
	INDUCED SERVICES-RELATED EMPLOYMENT WAGES AS RESULT OF CONSTRUCTION PERSONNEL WAGE SPENDING	APPROXIMATELY $107 MILLION IN DISPOSABLE INCOME	LOW IMPACT TO LOUISVILLE AREA	
	OPERATING WAGES	APPROXIMATELY $696 MILLION IN WAGES WILL BE PAID TO OPERATING PERSONNEL. OF THIS, $487 MILLION WILL CONSTITUTE DISPOSABLE INCOME. NEW GROSS INCOME IN TRIMBLE COUNTY AS A RESULT OF PLANT OPERATION WILL BE APPROXIMATELY $5 MILLION (WHICH IS APPROXIMATELY 12 PERCENT OF PROJECTED 1989 TOTAL EARNED INCOME IN COUNTY)	THROUGHOUT 36-YEAR TOTAL PLANT OPERATING LIFE MAJOR IMPACT TO 5-COUNTY REGION (INCLUDING TRIMBLE COUNTY) IN WHICH WAGES ARE EXPECTED TO BE SPENT	

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
ECONOMY (CONT'D)	INDUCED SERVICES-RELATED EMPLOYMENT WAGES AS A RESULT OF OPERATING PERSONNEL WAGE SPENDING	APPROXIMATELY $487 MILLION IN DISPOSABLE INCOME	LOW IMPACT TO 5-COUNTY AREA	
HOUSING	CONSTRUCTION PHASE HOUSING REQUIREMENTS	MAXIMUM EXPECTED CONSTRUCTION WORKER RELOCATIONS (35 PERSONS) MAY STIMULATE NEW HOUSING CONSTRUCTION IN TRIMBLE COUNTY	THROUGHOUT 14-YEAR CONSTRUCTION PHASE MODERATE IMPACT ON HOUSING INDUSTRY IN COUNTY. IF HOUSING DEMAND IS SPREAD OVER CONSTRUCTION PHASE, LOCAL CONTRACTORS COULD HANDLE THIS INCREASED DEMAND	
		POTENTIAL INFLUX OF MOBILE HOMES, WHICH COULD RESULT IN DEGRADATION OF LOCAL AESTHETICS AND POSSIBLY POSE HEALTH PROBLEMS (THERE ARE NO ZONING LAWS OR PUBLIC SEWERAGE FACILITIES IN TRIMBLE COUNTY)		
	OPERATING PHASE HOUSING REQUIREMENTS	NEW-HOUSING CONSTRUCTION CYCLE WILL BE INITIATED IN TRIMBLE COUNTY. UP TO 190 NEW HOMES COULD BE REQUIRED, BUT PROBABLY FEWER AS A RESULT OF DEPARTURE OF CONSTRUCTION FORCE	PRIMARILY DURING FIRST 6 YEARS OF PLANT OPERATION MAJOR IMPACT	
		REDUCTION OF AVERAGE AGE OF HOUSING IN COUNTY. RAISING OF AVERAGE VALUE OF HOMES		
		CREATION OF SERIOUS REQUIREMENTS FOR WATER, SEWAGE DISPOSAL, AND OTHER SERVICES		

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
TAXES	TAXES DURING CONSTRUCTION OF PLANT.		MAJOR IMPACT TO THE ECONOMY OF THE AREA	
	COUNTY TAXES	APPROXIMATELY $211,500 IN TRIMBLE COUNTY TAXES		
	STATE TAXES	APPROXIMATELY $6.4 MILLION IN KENTUCKY TAXES ON CONSTRUCTION PERSONNEL AND RELATED SERVICE WORKER WAGES		
	SALES TAXES	COULD AMOUNT TO $5.2 MILLION IN KENTUCKY SALES TAXES ON SPENDING OF CONSTRUCTION PERSONNEL AND RELATED SERVICE WORKER WAGES		
	TAXES DURING OPERATION OF PLANT		MAJOR IMPACT TO THE ECONOMY OF THE AREA	
	COUNTY PROPERTY TAXES	$9.8 MILLION IN TRIMBLE COUNTY PROPERTY TAXES		
	STATE INCOME TAXES	$27 MILLION IN KENTUCKY TAXES ON OPERATING PERSONNEL AND RELATED SERVICE WORKER WAGES		
	SALES TAXES	COULD AMOUNT TO $25.5 MILLION IN KENTUCKY SALES TAXES ON SPENDING OF OPERATING PERSONNEL AND RELATED SERVICE WORKER WAGES		
LAND USE	PLANT CONSTRUCTION AND OPERATING PHASES	2,300 ACRES OF PRESENT AGRICULTURAL AND WOODLAND LAND USES DEVOTED TO INDUSTRIAL USES	FOR DURATION OF PROJECT MAJOR IMPACT. SITE OCCUPIES .5 PERCENT OF FARMLAND IN TRIMBLE COUNTY; HOWEVER, THE SITE BOTTOMLAND (APPROXIMATELY 400 ACRES) CONSISTS OF SOME OF THE MOST FERTILE SOIL IN THE COUNTY	
	EFFECT OF REGULATIONS FOR THE PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY	IT IS DOUBTFUL THAT ANY NEW INDUSTRIES WITH SULFUR DIOXIDE COULD LOCATE IN SOUTHWESTERN TRIMBLE COUNTY OR EASTERN CLARK COUNTY, INDIANA	FOR DURATION OF PROJECT POTENTIAL MAJOR IMPACT; HOWEVER, MAJOR INDUSTRIAL DEVELOPMENT IS NOT PROJECTED FOR THESE AREAS	

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
TRANSPORTATION	PLANT CONSTRUCTION AND OPERATING VEHICULAR TRAFFIC	CONSIDERABLE CONSTRUCTION AND OPERATING PERSONNEL TRAFFIC AND SOME TRUCK TRAFFIC. TRAFFIC CONTROL SYSTEM WILL NEED TO BE INSTALLED AT INTERSECTION OF U.S. 421 AND SR 754. SR 754 WILL HAVE TO BE UPGRADED TO A CLASS A ROAD. CR 1488 WILL HAVE TO BE RELOCATED	THROUGHOUT PLANT CONSTRUCTION AND OPERATING PHASES MAJOR IMPACT TO EXISTING TRAFFIC LEVELS	APPLICANT WILL BEAR THE COST OF RELOCATING CR 1488
	PLANT CONSTRUCTION AND OPERATION BARGE TRAFFIC	A TOTAL OF 2 MILLION TONS OF MATERIAL, EQUIPMENT, AND COAL WILL BE DELIVERED TO THE SITE DURING CONSTRUCTION PHASE. A TOTAL OF APPROXIMATELY 256 MILLION TONS OF COAL AND OTHER MATERIALS WILL BE DELIVERED TO THE SITE DURING THE PLANT OPERATING PHASE. THIS AMOUNTS TO A TOTAL AVERAGE BARGE TOW (AT 15 BARGES PER TOW) DELIVERY RATE OF APPROXIMATELY 41 TOWS PER YEAR DURING CONSTRUCTION AND 632 TOWS PER YEAR DURING PLANT OPERATION	OVER PLANT CONSTRUCTION AND OPERATING PHASES LOW IMPACT TO EXISTING AND FUTURE OHIO RIVER BARGE TRAFFIC LEVELS. THE CANNELTON AND THE MCALPINE LOCKS HANDLE AN AVERAGE OF 105 TOWS PER WEEK OR 5,460 TOWS PER YEAR. THUS, CONSTRUCTION BARGE TRAFFIC WILL INCREASE PRESENT TRAFFIC LEVELS BY ONLY .7 PERCENT; OPERATION BARGE TRAFFIC WILL INCREASE PRESENT TOW TRAFFIC BY 12 PERCENT (THESE FIGURES INCLUDE BOTH LOADED AND EMPTY [RETURNING] TOWS)	
SOCIAL STRUCTURE	PLANT CONSTRUCTION AND OPERATION	SURROUNDING LOCAL POPULATION, ESPECIALLY THE RESIDENTS OF WISES LANDING, HAVE LONG BEEN ACCUSTOMED TO A LIFESTYLE RELATIVELY FREE OF NOISE, DUST, HIGH TRAFFIC LEVELS, AIR POLLUTANTS, AND INDUSTRIAL DEVELOPMENTS. THESE PEOPLE WILL NOW BE SUBJECTED TO CONDITIONS THAT NORMALLY	THROUGHOUT PLANT CONSTRUCTION AND OPERATING PHASES MAJOR IMPACT TO LOCAL RESIDENTS' QUALITY OF LIFE	

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
SOCIAL STRUCTURE (CONT'D)	PLANT CONSTRUCTION AND OPERATION (CONT'D)	TYPIFY MORE URBAN ENVIRONMENTS. LOCAL AND COUNTY SERVICES (SCHOOLS, ROADS, SEWERAGE FACILITIES, ETC.) WILL BE STRAINED. A DECLINE IN THE EXISTING QUALITY OF SERVICES MAY OCCUR INITIALLY		
PUBLIC HEALTH	POLLUTANTS FROM THE FIRING OF FOSSIL FUEL (COAL)	GROUND LEVEL CONCENTRATIONS OF SULFUR DIOXIDE, PARTICULATES, AND NITROGEN DIOXIDE WILL BE BELOW FEDERAL AND STATE PRIMARY AMBIENT AIR QUALITY STANDARDS, WHICH ARE DESIGNED TO PROTECT THE PUBLIC FROM ADVERSE HEALTH EFFECTS OF THESE POLLUTANTS. NEVERTHELESS, THE COMBINED EFFECTS OF SULFUR DIOXIDE AND PARTICULATES ARE POTENTIALLY MORE HARMFUL THAN HIGH LEVELS OF SULFUR DIOXIDE OR PARTICULATES ALONE. CHILDREN ARE MORE SUSCEPTIBLE THAN ADULTS TO ADVERSE EFFECTS FROM POLLUTANT EMISSIONS. HOWEVER, BECAUSE OF THE USE OF POLLUTION CONTROL DEVICES AND BECAUSE THE PROJECTED DISPERSION AND DIFFUSION CHARACTERISTICS OF THE PROPOSED PLANT ARE GOOD, HIGH CONCENTRATIONS OF POLLUTANTS ARE NOT EXPECTED TO OCCUR. 99 PERCENT OF THE PARTICULATE MATTER PRODUCED BY COAL FIRING WILL NOT BE RELEASED TO THE ATMOSPHERE. AT LEAST 90 PERCENT OF THE SULFUR DIOXIDE WILL BE REMOVED	THROUGHOUT PLANT OPERATION PHASE	

TABLE 14 (Continued)

I *ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT*	II *SOURCE OF IMPACTS*	III *PROJECTED IMPACTS OR EFFECTS*	IV *DURATION AND DEGREE OF IMPACT*	V *MEASURES TO MITIGATE PROJECTED IMPACTS*
AESTHETIC QUALITY	PLANT AND TRANSMISSION LINE CONSTRUCTION AND OPERATION	AESTHETIC CHARACTERISTICS OF THE SITE WILL CHANGE DRAMATICALLY. THE SITE WILL BE TRANSFORMED FROM A RURAL TO A HIGHLY DEVELOPED INDUSTRIAL SETTING. VEGETATION REMOVAL, SITE GRADING, CONSTRUCTION OF THE PLANT CHIMNEYS, COOLING TOWERS, DISPOSAL AND RETENTION POND DIKES, BARGE FACILITIES, POWER BLOCK, OFFICES, SUBSTATION, THE FILLING OF THE RAVINES WITH THE SOLID WASTE LANDFILL, AND TRANSMISSION LINES WILL ALTER THE VISUAL CHARACTERISTICS OF THE SITE. NOISE, DUST, AND GENERAL ACTIVITY ON AND AROUND THE SITE WILL FURTHER ALTER ITS PRESENT CHARACTER	DURATION OF PROJECT MAJOR IMPACT ON THE RESIDENTS OF WISES LANDING, ON PERSONS PASSING THE SITE ON CR 1488, SR 754, ON THE RIVER, AND ON PERSONS RESIDING IN HOMES OVERLOOKING THE SITE. THE TOPS OF THE CHIMNEYS AND THE COOLING TOWER PLUMES MAY BE VISIBLE ALONG PORTIONS OF U.S. 421. TRANSMISSION LINES PASSING THROUGH AGRICULTURAL AREAS IN INDIANA WILL HAVE A HIGH VISUAL IMPACT. HOWEVER, THE TOTAL NUMBER OF PEOPLE AFFECTED BY THE PROJECT'S IMPACT ON THE AESTHETIC CHARACTERISTICS OF THE AREA WILL PROBABLY BE RELATIVELY SMALL, EVEN GIVEN THE LENGTH OF TIME THE PROJECT WILL BE IN EXISTENCE	
NOISE	PLANT CONSTRUCTION AND OPERATION	NOISE FROM PLANT CONSTRUCTION AND OPERATION WILL BE A SOURCE OF ANNOYANCE TO THE RESIDENTS IN THE IMMEDIATE SITE AREA, PARTICULARLY WISES LANDING. CONSTRUCTION NOISE WILL PROBABLY BE MORE OF AN ANNOYANCE THAN OPERATING NOISE, PARTIALLY AS A RESULT OF THE FORMER'S INTERMITTENT NATURE	THROUGHOUT PLANT CONSTRUCTION AND OPERATING PHASES LOW TO MODERATE IMPACT DURING CONSTRUCTION; LOW IMPACT DURING PLANT OPERATION	SCREENING BERM ALONG SOUTHERN BOUNDARY OF PLANT AND DISPOSAL POND DIKES NEAR NORTHERN BOUNDARY OF SITE, AS WELL AS REMAINING VEGETATION AND PLANTS FROM REVEGETATION PROGRAM, WILL REDUCE PROJECT-RELATED NOISE DURING THE LATTER PORTION OF PLANT CONSTRUCTION AND DURING PLANT OPERATION

TABLE 14 **(Continued)**

I *ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT*	II *SOURCE OF IMPACTS*	III *PROJECTED IMPACTS OR EFFECTS*	IV *DURATION AND DEGREE OF IMPACT*	V *MEASURES TO MITIGATE PROJECTED IMPACTS*
SERVICES	PLANT CONSTRUCTION AND OPERATING WORK FORCE RELOCATIONS (A TOTAL MAXIMUM OF 803 PERSONS FROM 1978 THROUGH 2019 - SEE "POPULATION" UNDER COLUMN I)	COUNTY GOVERNMENT COULD BE HARD PRESSED INITIALLY TO MAINTAIN ADEQUATE LEVEL OF SERVICES. COUNTY'S CURRENT SEPTIC TANK SEWERAGE SYSTEM MAY HAVE TO BE UPGRADED. A FULLTIME DOCTOR MAY BE REQUIRED IN BEDFORD	THROUGHOUT PLANT CONSTRUCTION AND OPERATING PHASES MAJOR IMPACT, ALTHOUGH THIS EVENTUALLY WILL BE LARGELY OFFSET BY THE TAX REVENUES DERIVED FROM THE PLANT AND ITS OPERATING PERSONNEL AND BY CAREFUL PLANNING ON THE PART OF COUNTY OFFICIALS	
		NEW SERVICE FACILITIES (BAKERIES, VARIETY STORES, HAIRSTYLING, ETC.) MAY APPEAR IN BEDFORD, KENTUCKY. ALREADY EXISTING SERVICES WILL PROBABLY BE IMPROVED AND EXPANDED. CARROLLTON, KENTUCKY AND MADISON, INDIANA MAY ALSO EXPERIENCE SOME SERVICE-RELATED GROWTH	MODERATE IMPACT TO COMMUNITY ECONOMY	
		AN INCREASED DEMAND WILL BE PLACED ON TRIMBLE COUNTY SCHOOL SYSTEM BY APPROXIMATELY 56 CONSTRUCTION PERSONNEL CHILDREN AND APPROXIMATELY 300 OPERATING PERSONNEL CHILDREN	THROUGHOUT PLANT CONSTRUCTION AND OPERATING PHASES MODERATE TO MAJOR IMPACT SCHOOLS COULD ACCOMMODATE INCREASED DEMAND DURING CONSTRUCTION PHASE IF TEACHER'S AIDES CAN BE RECRUITED TO SERVE IN THE SCHOOL SYSTEM. TAX REVENUES DERIVED FROM CONSTRUCTION PERSONNEL RELOCATIONS WILL HELP OFFSET IMPACT DEMAND PLACED BY THE 300 OPERATING PERSONNEL CHILDREN COULD CAUSE A SEVERE IMPACT ON COUNTY SCHOOLS, UNLESS THE PRESENTLY PLANNED 300-PUPIL ELEMENTARY SCHOOL IS CONSTRUCTED	

TABLE 14 (Continued)

I ENVIRONMENTAL COMPONENT AFFECTED BY PROPOSED PROJECT	II SOURCE OF IMPACTS	III PROJECTED IMPACTS OR EFFECTS	IV DURATION AND DEGREE OF IMPACT	V MEASURES TO MITIGATE PROJECTED IMPACTS
SERVICES (CONT'D)	PLANT CONSTRUCTION AND OPERATING WORK FORCE RELOCATIONS (A TOTAL MAXIMUM OF 803 PERSONS FROM 1978 THROUGH 2019 - SEE "POPULATION" UNDER COLUMN I) (CONT'D)		AN OVERLAP OF CONSTRUCTION AND OPERATING PERSONNEL SCHOOL REQUIREMENTS BETWEEN 1983 AND 1991 COULD RESULT IN TEMPORARY OVERCROWDING AND REQUIRE SHORT-TERM ALTERNATIVE FACILITIES	
			CAREFUL PLANNING BY COUNTY AND SCHOOL OFFICIALS WILL HELP REDUCE THE POTENTIAL IMPACT	
		SCHOOL SYSTEM MAY UNDERGO LONG-TERM IMPROVEMENT AS A RESULT OF REVENUES DERIVED FROM PLANT OPERATION AND PERSONNEL		

MEASURES TO MITIGATE ADVERSE ENVIRONMENTAL IMPACTS

The Applicant and the EPA have developed a set of measures to reduce identified adverse impacts of construction and operation of the Trimble County Generating Plant. These measures focus primarily on control of noise, dust, water, and air pollution. In addition, discharges from the runoff retention basin and the solid waste disposal ravines and flue gas emissions will be monitored.

Several of these mitigative measures have been formally established in a Stipulation (given as an attachment to this summary report) agreed to by the Applicant and the EPA as the prerequisite to approval of an NPDES permit. Subsequent to this Stipulation, and after additional information was supplied to the EPA by the Applicant, effluent limitations and permit conditions were established and a draft NPDES permit was written for the proposed project (see Appendix T of the supporting report).

NOISE CONTROL

Noise from construction equipment can be mitigated to some extent by the use of proper muffling devices on all engines. Construction management must make certain that Occupational Safety and Health Act standards are met by providing ear protection to workers when and where required.

A site arrangement study conducted by the design engineers included reduction of boundary noise as a major criterion for placement of various plant elements. On the basis of this criterion, cooling towers, main plant buildings, barge unloading facilities, and coal-handling equipment were located as far from Wises Landing as practical. For most principal noise sources, measures to reduce the noise will be taken. There will be individual treatment of exceptional noise-producing equipment. The main building, which houses the major equipment, will be enclosed with insulated metal siding. This feature will help considerably in reducing the level of noise emitted from the plant.

In addition to the design features incorporated into the plant to reduce the noise emitted, other steps will be taken to attenuate emitted sounds. After construction of the plant, the site will be landscaped and vegetated. During the construction phase, a vegetated berm will be constructed along Kentucky Highway 754. This berm will significantly reduce noise emissions from the plant. The natural and planned vegetation located on the site will absorb some of the noise, thereby reducing the noise level at and beyond the site boundary.

Dust collectors, discussed under "Dust Control," would also serve to limit noise emissions from coal unloading and transfer operations.

DUST CONTROL

The Applicant will minimize fugitive dust production on site by: (1) limiting clearing and grading operations to those areas essential to maintain construction sequence and schedule, (2) grassing disturbed areas as promptly as possible, and (3) using dust control or abatement measures on roadways or cleared areas.

Dust abatement procedures that could be used during construction include covering construction roads with a stone and petroleum base and spraying potentially dusty areas with water. The requirement will be greatest during summer months when the soil-evaporative stress is greatest.

The effects of construction equipment engine exhaust can be allayed by routine engine maintenance and tuning.

Control of fugitive dust from the handling and storage of coal and limestone will require a more extensive program. The primary means of controlling dust emissions from open bulk-material handling operations is the use of wet sprays. The sprays are most frequently water; however, in some circumstances, special surfactants are added to the water or a hydrocarbon-based liquid is used.

It is assumed that sprays would be used at the unloading facilities and coal and limestone piles as appropriate. At mechanical transfer points, the operations would be enclosed and dust-laden air would be filtered through bag-type filters.

Dusting prevention at the coal and limestone piles is achieved by management of the material pile. This entails careful compaction of the pile surface at the time of material storage and, under some conditions, "skimming" with hydrocarbon-based materials.

At the pug mill, a small quantity of conveying air will need to be vented. If mixing of the sludge cake with the fly ash and fixation agent is sufficiently complete, this air could be vented through the mill itself. Otherwise, a spray for dust suppression will be introduced at the discharge from the mill.

WATER POLLUTION CONTROL

Measures to protect the water and associated aquatic life from damage by the plant are the stormwater runoff retention system, sanitary facilities and waste treatment, and closed cycle plant water system. The following are additional measures that will be employed.

Erosion Control

The following construction practices will be used to reduce erosion and provide sediment control during construction.

1. As much natural ground cover as possible will be retained and protected; areas where cover is removed will be seeded with fescue (sloped areas) or rye (in areas requiring immediate erosion control)
2. Where possible, work will proceed in small units, exposing a minimum of surficial area to soil erosion

3. Structures and final grading and surface protection will be completed as quickly as possible

4. Where it is necessary to delay completion, temporary seeding or mulching will be used to control erosion

5. Moderate slopes will be used to reduce the velocity of runoff and to facilitate the establishment and maintenance of a good ground cover

6. Runoff will be diverted away from excavations, embankments, and other exposed surfaces by means of temporary berms, dikes, and slope drains as required

7. Major earthwork will be scheduled during the summer months. This period allows the establishment of healthy vegetation and historically has the least amount of rainfall

8. Impounded water will be used for construction purposes as much as practicable

9. In the ravine areas, where possible, tree stumps and roots and ground cover vegetation will not be removed. Tree clearing will be selective and progressive; the tops of the ridges will not be cleared

10. Riprapping of vegetation will be used to stabilize the banks of the relocated Corn Creek channel as well as the dikes and banks along the Ohio

Accidential Leakage and Spillage Control

Leakage and spillage could cause significant short-term deterioration of the water quality and the elimination of large quantities of aquatic biota at and downstream of the spill. In order to protect the environment from accidental spillage of materials (coal, fuel oil, limestone, chemicals) barged to the Trimble County Generating Plant, the following plans have been made.

All coast guard regulations dealing with oil transfer facilities and operation will be complied with; an operations manual for the facility will be prepared and submitted to the captain of the port of Louisville, Kentucky. A spill prevention control and countermeasure plan will describe spill prevention measures.

A floating boom will be used to contain any oil that might be spilled during barge unloading. A motorized work barge with an oil skimmer will be used if oil cleanup operations are necessary. Facilities for the unloading of chemicals will be designed to minimize the possibility of spills. A containment system will be built around the oil storage facilities on land. Tanks and diking will be constructed in accordance with American Petroleum Institute standards. Dikes will be sized to contain at least 110 percent of the capacity of the largest tanks and will be provided with concrete sumps. Any water collected in the sumps will be pumped to an oil separator for recovery of the oil and reuse of the water.

Ground Water Protection Measures

In order to prevent contamination of ground water by fuel and chemical stockpiles and by solid waste disposal, the Applicant will take the following precautions:

1. Solid waste (fly ash and scrubber sludge) will be rendered stable, impermeable, and nonleachable, if possible, by means of a chemical stabilization process

   Disposal of the stabilized solid waste will be phased. During the first 2 years of plant operations, a test disposal process will be used. At the mouth of one of the smaller ravines leading into Ravine RB, a dam to control runoff will be constructed. The sludge/ash mixture will be terraced behind the dam. Runoff would be monitored and, depending on its condition, either (a) discharged directly to Corn Creek, (b) treated and returned to Corn Creek, or (c) recycled. This test disposal process will provide data on which to establish the procedure for developing the remaining disposal areas, including the extent of required monitoring of ground water and runoff

2. In lieu of a satisfactory stabilization process or of proven long-term reliability, a suitable off-site disposal area will be selected by the Applicant. A complete environmental analysis (EIA) of the site will be performed and presented to the EPA and the Commonwealth of Kentucky. The EIA will include detailed descriptions of the entire process, including: transport, control of surface runoff, control of leachate, and a complete delineation of impact to the natural and human environments

3. All fuel, chemical, and onsite waste disposal areas will have engineered containments featuring impermeable liners and dikes of sufficient size to provide protection from flooding, and containment of spills or runoff water. The waste disposal areas have a combined 30-year disposal capacity

AIR POLLUTION MITIGATION

Measures to mitigate the emission of pollutants from the plant are described in Sections 3.4 and 4.2 of the Draft EIS. These include: increased stack height, natural draft cooling towers, the SO_2 scrubber system, and the electrostatic precipitators.

During periods of lengthy shutdown of the scrubber system on a particular generating unit, the Applicant proposes to employ one of the following strategies to control the SO_2 emissions from the plant so that the plant continues to meet the allowable deterioration increments:

1. Reduce the generating load on the unit and increase the SO_2 control efficiency on the remaining units

2. Burn an alternate coal in the unit

The Applicant will maintain a 30-day supply for one unit of an alternate coal on the plant site. This coal may be substituted for the normal plant fuel to allow continued unit operation while the scrubber system is down.

Fuel oil tanks will be equipped with floating roofs, vapor conservation vents, and flame arresters.

OTHER MITIGATIVE MEASURES

Navigational Warnings

Navigation lights and required navigation warnings will be provided for the mooring cells in the Ohio River. Barges moored at the cells will cause little interference with river traffic. Two barge tows will extend approximately 200 feet from the mooring cells into the channel; the barges will be approximately 1,000 feet from the center of the channel.

Measures to Protect Aquatic Life

Although the relocation of Corn Creek will diminish the backwater area as a habitat for Ohio River fish, habitat improvements can be provided to enhance the new Corn Creek channel, if required. Fish, water quality, and benthic samples have been taken in the existing backwater areas to assess the present value of habitat in cooperation with state and federal wildlife agencies. This will allow for joint determination of appropriate measures and cost for fishery management or improvement.

The Applicant assumes responsibility for clean-up of all spills to the Ohio River resulting from barge loading or unloading operations involving oil, coal, desulfurization reactants, or other chemicals used at the facility. Oil pollution prevention procedures as stated in 40 CFR Part 112 will be followed.

Intake velocity at the intake structure screen will not exceed 0.5 feet per second.

MONITORING PROGRAMS

Ground Water Monitoring

The Applicant will implement a ground water monitoring program. Monitoring of the ground water downgradient of the onsite bottom ash and emergency fly ash and scrubber sludge disposal pond, as well as coal storage areas, will be performed monthly. Quarterly reports will be submitted to the EPA and the Commonwealth of Kentucky. Applicable EPA-approved methods will be used to determine, to the limits of detection, the following constituents in the ground water:, copper, iron, lead, mercury, nickel, selenium, sulfide-sulfite-sulfate compounds, and total suspended solids.

The EPA will be informed of any proposed changes to the monitoring program. The EPA may require additional monitoring, if warranted, following the placement of additional units on the site or following the initiation of use of new areas for coal storage or ash or sludge disposal ponds. If leachate is suspected, ground water monitoring in the ravines may be required.

Should the quarterly reports demonstrate significant contamination of ground water, the Applicant will implement measures to mitigate such contamination and to assure that no future contamination will occur. Those measures acceptable to EPA may include but not be limited to: sealing, relocating, or altering operations of the ash or sludge disposal ponds and/or coal storage area.

Water Discharge Monitoring

Water discharged from Ravines RA and RB will be monitored, as will also water discharged from the runoff retention basins, to ensure that discharge meets applicable federal and state water quality requirements. Water discharge monitoring requirements are described in the draft NPDES permit appended to this report.

Flue Gas Emissions Monitoring

In-stack monitors will be used to measure flue gas emissions in accordance with state and federal monitoring regulations.

TRANSMISSION LINE MITIGATIVE MEASURES

Transmission line corridors in Indiana will be selected on the basis of minimizing clearing and reducing the number of stream crossings. Only unavoidable crossings will be made. Clearing will be selective. Where possible, streams will be crossed at narrow points and the line will cross perpendicularly. Transmission towers will be kept at least 50 feet from stream banks. Also, vegetation along stream banks will be left as is, if possible.

The following is a presentation of additional mitigative measures.

Construction Measures

After the initial mechanical clearing of the transmission line right-of-way, herbicides will be used on woody vegetation only. Maintenance Use of herbicides will be limited to no more than one application in 5 years. When herbicides are required, their application will be limited to: (1) periods when the wind speed is less than 5 miles per hour, and (2) areas no closer than 500 feet from any streams. Clearing within the corridor will employ the selective basal cutting method rather than rooting and grubbing. Only "danger" trees bordering the right-of-way will be cut. Necessity for clearing will vary with terrain, but, on level areas, vegetation of a height not exceeding 20 feet when mature will be allowed underneath the lines.

Sensitive man-made or natural areas will be avoided to the maximum extent possible. When the final alignment is determined (prior to land acquisition for the Indiana Trimble County to Northside Substation), ground level surveys will be conducted along the corridor to definitively locate such areas, including archaeological sites potentially eligible for inclusion in the National Register of Historic Places. The archaeological survey will be closely coordinated with and reviewed by the state archaeologist.

The vegetative survey will be done along the entire corridor, and this work also will be coordinated with the state. Wildlife biologists and foresters with the Indiana Department of Natural Resources could help locate particular survey areas and suggest mitigative action, if needed.

The Applicant will limit, as much as possible, the number of access roads to the right-of-way. Also, vegetation which would provide visual barriers to transmission line corridors will be preserved. Replacement plantings will also be employed where needed in this respect.

Operation Measures

The Applicant will assume the cost of remedying any adverse effects on radio or television reception caused by its transmission lines.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30308

IN THE MATTER OF

NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM
APPLICATION NO. KY0041971
LOUISVILLE GAS
AND ELECTRIC COMPANY
TRIMBLE COUNTY POWER PLANT
UNITS 1,2,3, and 4

STIPULATION FOR THE
APPROVAL OF THE
REGIONAL ADMINISTRATOR

Applicant

PRELIMINARY STATEMENT

The Louisville Gas and Electric Company, (the "Applicant") has applied for a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) to discharge pollutants from the proposed Trimble County Power Plant. The application has been identified as NPDES No. KY0041971. On March 19, 1975, the EPA Regional Administrator made the determination that construction of the Trimble County Plant was construction of a new source within the purview of Section 511 of the Federal Water Pollution Control Act (the Act) and thereby would require an environmental review pursuant to the National Environmental Policy Act of 1969 (NEPA), prior to issuance of the permit. On November 3, 1975, EPA decided that an Environmental Impact Statement (EIS) would be necessary for this project.

The EIS identified potentially unacceptable environmental impacts in the form of future contingencies. The stipulations set forth below were developed pursuant to EPA's authority and responsibility under the Act and under NEPA. It is understood by both parties that this stipulation has been entered into for the purposes of preventing or minimizing potentially adverse environmental impacts identified in the EIS and for the purposes of obtaining EPA's recommendation to issue the permit.

STIPULATION

The Applicant and the Regional Administrator, Environmental Protection Agency, Region IV, stipulate and agree as follows:

1. Prior to start-up, the Applicant shall line the bottom ash pond and the emergency fly ash/scrubber sludge disposal pond to impede leaching.

2. Within 12 to 18 months after initiation of the scrubber waste stabilization process, the Applicant shall demonstrate to the Regional Administrator the efficacy of its operation. If long term retention of pollutants without significant leaching can not be demonstrated, the Applicant shall select and submit to the Regional Administrator for approval either a long term off-site disposal area and waste disposal plan or a plan to modify the on-site disposal areas to accommodate unstabilized scrubber sludge. If appropriate, the applicant shall also provide an acceptable interim plan to lessen or avoid adverse impacts to the environment. If off-site disposal is selected by the Applicant, then the Applicant agrees to provide a complete environmental impact analysis (EIA) of the proposed long term plan. EPA shall determine the proper scope of the EIA, which at a minimum will include detailed descriptions of the entire process including transport, control of surface runoff, control of leachate, alternatives and a complete projection of impacts to the natural and manmade environments.

   The applicant agrees not to initiate construction on any portion of the plan prior to receipt of approval from the Regional Administrator.

3. In the event a flue gas desulfurization (FGD) system becomes inoperative, the Applicant shall take measures to operate the unit(s) within the applicable Prevention of Significant Deterioration (PSD) increments in effect at the time of issuance of the PSD Approval to Construct.

   The Applicant will maintain, on site, a 30-day supply of alternate coal of a quality which will permit operation of one unit within the above stated limitation.

when a FGD system is out of service. The Applicant will burn the alternate supply of coal and/or follow other operating procedures designed to operate the station within the above stated limitation when a FGD system is out of service.

After 12 months of FGD system operating experience, the Applicant shall submit to the Regional Administrator for review and approval a long-term operating procedure and malfunction contingency plan for the operation of the station.

4. Prior to the selection and initation of construction of the proposed final alignment of the Clark County, Indiana transmission corridor, the Applicant shall submit to the Regional Administrator for review and approval the following:

   a. A plan of study (POS) for determining archaeological resources along the transmission corridor, and

   b. A POS for a ground level vegetative/wildlife habitat survey along the transmission corridor.

   The Regional Administrator shall approve or modify each POS following consultation with the Indiana State Archaeologist and Director, Indiana Department of Natural Resources, respectively. The Applicant shall perform the studies as approved and supply a report on the results of the studies to the Regional Administrator for completion of EPA's environmental review on this portion of the project. The applicant agrees not to initiate construction on this transmission line prior to receipt of approval from the Regional Administrator.

5. Except for future determinations by the Regional Administrator on matters herein, the Applicant waives its right to request an adjudicatory hearing on any item agreed to herein.

6. Nothing in this Stipulation shall be deemed to relieve the Applicant from liability for non-compliance with other provisions of the Federal Water Pollution Control act as amended, or any other federal laws, including any requirements of the Resource Conservation and Recovery act of 1976 which might be made applicable to this facility.

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7. The terms contained herein shall not bind any person not a party to the Stipulation and shall not bind the Applicant or the U.S. Environmental Protection Agency until signed by the Applicant and the Regional Administrator, Region IV.

Date ______ Applicant ______

BY: ______

Date ______ Director, Enforcement Division
U.S. Environmental Protection Agency
Region IV

Date ______ Regional Administrator
U.S. Environmnetal Protection Agency
Region IV

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